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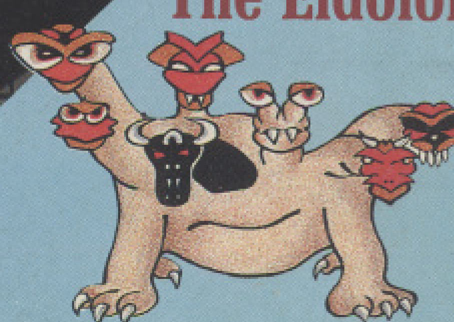
ATARI USER

Vol. 4 No. 1 May 1988 £1.25

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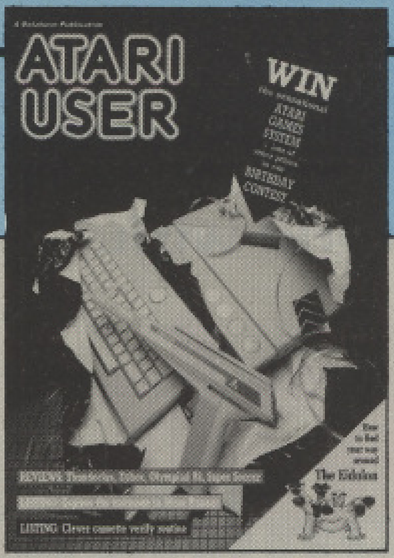
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Get it right! II

All major listings in this issue are accompanied by checksums to help overcome typing mistakes. For full details of how they work, see the article on page 23 of the November 1987 issue of *Atari User*.

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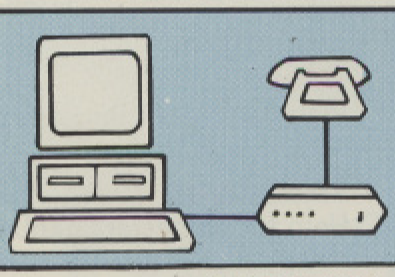
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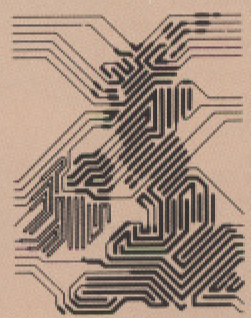
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ATU5

ATARI USER NEWS REVIEW

Cashing in on price rises

THE Atari 8 bit could be heading for a boom – courtesy of price increases which have hit the ST range.

While Atari has consistently cut production costs and pared its own margins, it has now announced that it can no longer absorb the financial difficulties caused by the world shortage of memory chips.

The shortage stems from Japanese restrictions on chip production – prompted by trade disputes with the States.

And particularly affected are dynamic random access memories (drams) which are at the core of more powerful computers – and for users this translates as the higher the power, the higher the price.

In turn, this means that the 520 and 1040 STs have been hiked by a hefty £100 each. Trade sources are positive this will boost 8 bit sales.

"We expect the recent price increase on the ST to make the Atari games machines a more attractive proposition", one leading dealer told *Atari User*.

"After all, you can now buy a complete Atari games system for little more than the amount of the price increase".

Atari has been trying for some months to buy out a chip manufacturing company "so that we are not subject to the whims of third party suppliers" according to one company spokesman.

And should the venture prove successful, prices could again fall.

But in the interim, the 8 bit market seems set for a resurgence.

Gadgets Goulding 'joins up'

REGULAR contributor Len Golding has landed a plum job – thanks to his articles in *Atari User*.

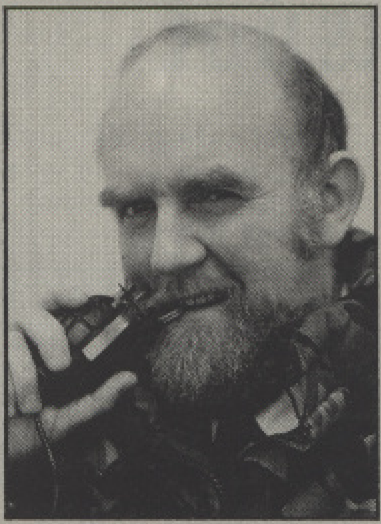
Len, who has been writing for the magazine since its early days, is perhaps best known for his gadgets series.

And it was this that caught the eye of Earl Morse, who is the science coordinator for American forces in Germany and provides materials for USAF schools throughout Europe.

The 147 schools, with thousands of pupils of all ages, all have computers installed – 2,000 of them.

Earl was so impressed by Len's articles that he's signed him up for a contract to assist school teachers with science-related projects in the classroom.

Regular readers need not worry however, Len will still be contributing to *Atari User* and has a host of gadgets in the pipeline.



Joystick is going a bomb...

WHEN is a joystick not a joystick? When it's a hand grenade of course. And that's the problem with Robtek's latest offering for the Atari 8 bit market.

The unusual design of its Terminator joystick has already caused security officers at Heathrow airport to refuse to let the device on board an aircraft.

"The trouble is that the Terminator is too realistic", said a spokesman for Robtek (01-847 4457).

"Airport authorities at Heathrow called us and asked if we would warn our customers not to try and take the grenade-shaped device on board planes as hand luggage.

"Rightly they are concerned about the possibilities of someone removing the cables from the joystick and threatening the flight crew with what looks for all the world like a real hand grenade".

Robtek is now enclosing a leaflet with all new deliveries of the Terminator joystick warning customers not to try to take it on board as hand luggage.

Price £19.95.

Silica backing for 8 bit Ataris

A MASSIVE commitment to the 8 bit games market has been made by Silica Shop with the purchase of 50,000 roms.

"Our reputation was built on the Atari 8 bit and we have no plans of dropping it in favour of the ST", said John Hambly, Silica's buying controller.

"We have a warehouse full of software for the machine with a tremendous selection of both old and new titles", he said.

The announcement from Silica comes as Atari is trying to set up a dealer network of 20 shops to promote greater support for the 8 bit market.

Plans to introduce new software display shelving in selected dealers stores are at an early stage, but some retailers are treating the new initiative with a little scepticism

Harry Nadler of Red Rat Software said: "It is a great idea if it works. Had this happened about two years ago then the Atari 8 bit computer may have had a higher profile in the market place than it has today".

Conversion

AFTER a successful debut on the Commodore 64 and Spectrum, Nebulus – from Hewson (0235 832939) – is being converted for the Atari 8 bit.

"Originality pays handsome dividends", said managing director Andrew Hewson. "We've had a number of approaches for the various conversion rights".

ATARI USER NEWS REVIEW

X marks comms blackspot

COMMUNICATIONS problems caused by British Telecom's new System X appear to be on the increase.

Difficulties arise when the new digital system is connected to the older analogue exchanges. To make the two compatible BT has had to attenuate the signal.

One outcome of the drop in level is that modems have difficulty in maintaining the line once logged on.

Rob Flemming of Pace Micro Technology said: "We have had a number of complaints from Atari users who are using our Nightingale modem. After a good deal of research, as well as a large number of expensive phone calls, BT admitted to causing the fault".

According to Flemming, communication difficulties appear to get worse when dialling from one System X exchange to another.

"Not only are outgoing lines attenuated, but incoming lines as well. Between two new exchanges the loss in signal level is dramatic", he said.

A spokesman for British Telecom told *Atari User*: "We are aware of the difficulties being caused by our modernisation program. Once System X is in use nationwide it will actually improve data transmission and reception.

"To overcome the immediate problems, Atari users in a System X exchange can request British Telecom to unattenuate the line".

Loading chart leader

THE latest budget title from Atlantis – League Challenge – roared straight to the top of the Gallup Chart. However, as several readers have pointed out, the loading instructions on the inlay card are incorrect – instead of holding down the Start and Option keys, it's only necessary to hold down the Start key.

Drive delay rapped

ATARI UK is letting the side down, according to Karen Sutherland, manageress of computer dealer Atari World in Manchester.

The attack comes after repeated enquiries to Atari about the availability of disc drives for its 8 bit games machines.

For despite Atari's announcement of its XF551 drive last summer, supplies still haven't reached the shops.

"I am furious about the situation", said Karen. "If a disc drive was readily available I could sell at least 30 to 40 a week. Every time I contact the people at Atari to find out when supplies will be available they just say they are waiting for a boatload to arrive from Singapore. It must be a very slow boat".

One outcome of the shortage is that the older 1050 drive is maintaining a high second-hand value with prices in the region of £95.

An Atari spokesman said: "We are still waiting for the disc operating system to be finished, which it should be in the next couple of weeks.

THE GALLUP CHART TOP 20 ATARI SOFTWARE

THIS MONTH	LAST MONTH	TITLE (Software House)	PRICE
1	▲ 9	**SPEED ACE** *Zeppelin*	2.99
2	●	**ROCKFORD** *Mastertronic*	2.99
3	●	**STEVE DAVIS SNOOKER** *Blue Ribbon*	1.99
4	▲ 8	**SPACE SHUTTLE** *Firebird*	1.99
5	▼ 3	**POLE POSITION** *Atari*	12.99
6	▲ 16	**MILK RACE** *Mastertronic*	2.99
7	●	**FOOTBALL MANAGER** *Addictive*	2.99
8	●	**SPOOKY CASTLE** *Atlantis*	1.99
9	▲ 13	**PLATFORM PERFECTION** *US Gold*	9.95
10	●	**NINJA MASTER** *Firebird*	1.99
11	▼ 1	**LEAGUE CHALLENGE** *Atlantis*	1.99
12	●	**GAUNTLET** *US Gold*	9.95
13	▼ 2	**PANTHER** *Mastertronic*	1.99
14	▼ 4	**FEUD** *Mastertronic*	1.99
15	▼ 6	**HENRY'S HOUSE** *Mastertronic*	1.99
16	▼ 14	**GHOSTBUSTERS** *Mastertronic*	1.99
17	●	**WINTER OLYMPIAD** *Tynesoft*	9.95
18	●	**FREEWAY** *Activision*	9.95
19	●	**ACE OF ACES** *US Gold*	9.99
20	▼ 11	**180** *Mastertronic*	2.99

Compiled by Gallup/Microscope

There are nine new entries this month, including a few old games making their appearance in the chart. The first game from Zeppelin goes to number one, followed by the entry of two old favourites in second and third positions.

Mini Office II



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AT5

Learn your token tables

ANDRÉ WILLEY ends his look at Atari Basic by giving you a program to investigate listings

I START this month's final look into the inner workings of Atari Basic with a small apology. If you read my Checksum Buster article in the April issue, as a good many of you did judging by the mail we have received, you might have been a little upset to find the message APRIL FOOL splashed all over your screen.

Sadly, re-assembling a line of text from a three digit checksum is impossible – there are many different permutations which can generate the same value. Apart from being a lesson in never trusting anyone – not even me – it does teach us quite a few useful things about how Basic works.

When you used the program, typing LIST just caused a page of jovial text with no line numbers or command words to be output. So, how can a program exist in a tokenised – or SAVE format – file if it contains nothing that could have been correctly tokenised in the first place?

The answer is that Basic only checks for the validity of a program line when you type it in or use ENTER. It therefore assumes that any SAVEd tokenised file must have been error checked at the original time of entry and is now syntactically correct.

What Checksum Buster does is create a file which is correct in terms of the individual tokens and pointers, but makes no sense as a logical program.

To understand it further, let's take a look at the file format used by Basic when you type SAVE or CSAVE.

The bulk of it consists of the tokenised program lines themselves in the format that we have been looking at so far. The variable name table must also be saved because the tokenised version of a program holds only the variable reference numbers and is meaningless without the corresponding names.

For some reason a SAVEd file also contains the complete variable value table. I really don't see why it couldn't have been re-generated at LOAD time, saving a couple of hundred bytes on even the shortest of files. But if you know, why not drop us a line?

The only other information required by Basic is the contents of the zero page ram pointer table which is saved at the start of the file – see Figure I.

One problem with saving this address pointer table is that it is only applicable to the current system set-up. If, for example, you decide to move from a cassette system to a disc one, the value of LOMEM will be much higher due to the presence of Dos.

Since the first entry in the zero page table is LOMEM itself the first two bytes in a SAVE format file will always be zero – calculated from LOMEM minus LOMEM. Similarly, the second two bytes – which represent the address of the variable name table – will always be 256 because this table is 256 bytes from LOMEM.

These seven offset values take up the first 14 bytes of the file, and are followed by the variable name, value and statement tables containing all the actual program lines.

The final element of the file is the current statement line – numbered 32768 – which contains whatever command Basic was currently processing.

Normally the last thing being worked on before a file is written is the SAVE command itself, and this is what you would usually expect to be found here.

This file format is shown in Figure II, but you might like to see it in action for yourself by typing in the listing. As written it will only work on disc files because there is no facility for random access within a tape file. However, cassette users might like to try modifying it to read a complete file into memory and examine it from there.

Type it in and check it with Get It Right! before running it. Be especially careful with lines 6400 to 6520 which contain a machine code routine.

After you type RUN, the program will check which version of Basic you are using and read the various rom-based text tables into the pseudo string arrays *CMD$* and *OP$*. These will later be used to display the correct text for each available token.

Once this is complete you will be asked to enter a filename. Use the full name – such as D2:FILE.BAS – of the Basic SAVEd file you want to view. The first 14 bytes will then be read in and the rest of the file scanned to obtain the correct NOTE and POINT

Turn to Page 10 ▶

Address	Name	Function
128/129	LOMEM	Lowest memory address accessible after Dos.
130/131	VNTP	Variable name table pointer (start address of VNT)
132/133	VNTD	Variable name table dummy (end address of VNT)
134/135	VVTP	Variable value table pointer (contents of variables)
136/137	STMTAB	Statement table (start address of tokenised program)
138/139	STMCUR	Current statement (address of final tokenised command line)
140/141	STARP	String/array pointer (address of string/array contents)
142/143	RUNSTK	Runtime stack (internal GOSUB/FOR..NEXT addresses)
144/145	MEMTOP	End of current Basic program space

(All addresses stored as two bytes, in standard 6502 low-high format)

Figure I: Basic's zero page pointer table

◀ **From Page 9**

values for each of the file segments we are interested in – the variable name, value and statement tables.

You will then be shown the information obtained from the first 14 bytes and be asked if you wish to view the variable name table or a program line. At this point you may also toggle between printer output and screen display by pressing the spacebar, or press the Escape key to select a new filename.

The variable listing will show the full name and reference number for each variable in the table, including those which may no longer be in use in the main body of the program. You will also see what type it is and the data stored in the variable value table.

Numbers are shown in an expanded BCD layout, although you could change lines 1190 to 1270 to print them in normal numeric form if you wish.

The program listing will look very different to the form you are used to seeing from the LIST command. Individual statements on a single program line are shown separately, with an overall header for each and with each statement being numbered.

I've also omitted much of the normal expansion of string and numeric constants – so all numbers will be shown as *nnn* and all strings will be shown as *$$$*.

Equally, lines containing standard Ascii text – such as REM and DATA – will be shown as *$$$+EOL* in place of the text itself. Variables will be displayed at *Var0*, *Var1*, *Var2* and so on. Implied commands will be shown inside square brackets – such as the implied LET on a line like:

```
100 NUMBER=100
```

which would be shown as:

```
[LET] Var0=nnn
```

These changes have been made to help you see the structure of the program without being distracted by the finer details. After all, if you'd wanted to see a normal listing, all you needed to do was type LIST.

If you try out this program on the Basic file created by last month's Checksum Buster you'll start to see how the seemingly impossible was created. All the lines of text were stored in the variable name table, with the final character of each in inverse video to fool Basic into thinking they are just long variable names.

So you've discovered that a complete program can't be made from its checksums, but you might have learnt more about the way that Basic functions and also that the tokenising system is not quite as rigid as it first looked.

There is a well known saying which applies very well to computers, and especially to Basic: It's impossible to make anything completely foolproof because fools are so ingenious.

PROGRAM BREAKDOWN

10-70	Initialise, dimension strings, and so on
80-90	Print the title message
100-250	Get filename, open file scan and store NOTE values
260-350	Print file's header information
360-510	Menu choice and printer/screen select function
	Printing out variable name table information
1000-1120	Get variable name and value data and print the name
1130-1180	Check for which type of variable
1190-1280	Print numeric variable information
1290-1350	Print numeric array information
1360-1410	Print string variable information
	Printing out program listing from statement table
2000-2080	Get line number and print length details
2090-2100	Print segment number and length
2110-2130	Get command token and print expanded version from *CMD$*
2140-2290	Get each operator token byte in turn, print expanded version from *OP$* and check for special cases such as 22 – EOL – and 20 – end of statement
5000-5040	Subroutine to call Get-bytes routine from *BGET$*
	Initialising strings
6000-6040	Test for Revision A, B or C and gives a Basic error if none of these
6100-6170	Create *CMD$* from command token table in Basic rom
6200-6270	Create *OP$* from operator token table in Basic rom
6300-6360	Add special cases such as implied LET and so on
6400-6430	Read *BGET$* data for binary Get-byte routine
6500-6520	Data for machine code binary Get routine
10000-10010	File format error handler

Part I: These values will be added to LOMEM to form the zero page ram table.		
Bytes	**Contents**	**Function**
0/1	0	File format flag (zero)
2/3	256	Displacement of the variable name table from the beginning of part two, plus 256
4/5	DVNTE	Displacement to the end of the variable name table from the beginning of part two, plus 256
6/7	DVVT	Displacement of the variable value table from the beginning of part two, plus 256
8/9	DST	Displacement of the statement table from the beginning of part two, plus 256
10/11	DSTC	Displacement of the current statement line from the beginning of part two, plus 256
12/13	DEND	Displacement to the end of the file from the beginning of part two, plus 256
Part II: Starts at byte 14 of the file		
0	VNT	Variable name table
DVVT–256	VVT	Variable value table
DST–256	ST	Statement table
DEND–256		End of file

Figure II: SAVE and CSAVE file format

```
10 REM TOKENISED BASIC PROGRAM VIEWER
20 REM BY ANDRE WILLEY
30 REM (c)ATARI USER
40 REM
50 DIM FILE$(30),INP$(300),BUFFER$(250
0),SPACE$(80),CMD$(800),OP$(1000),BGET
$(40)
60 BUFFER$(1)=" ":BUFFER$(2500)=" ":BU
FFER$(2)=BUFFER$:SPACE$=BUFFER$:CMD$=B
UFFER$:OP$=BUFFER$:OPEN #3,4,0,"K:"
70 GRAPHICS 0:POKE 82,0:POKE 752,1:? :
? " PLEASE WAIT 20 SECS -- CREATING TA
BLES":? :GOSUB 6000:GOTO 100
80 POKE 82,0:GRAPHICS 0:SETCOLOR 4,9,4
:? "     TOKENISED BASIC PROGRAM VIEWE
R"
90 ? :? "   Copyright (C) Atari User,
May 1988":? :RETURN
100 REM ** INPUT NEW FILE **
110 GOSUB 80
120 TRAP 100:? :? :? :? "   Enter new
filespec: ";:INPUT #16,FILE$:POKE 752,
1:?
130 CLOSE #1:OPEN #1,4,0,FILE$
140 ? "   PLEASE WAIT: Scanning file n
ow"
150 GET #1,A:GET #1,B:MEMLO=A+B*256:IF
 MEMLO<>0 THEN 10000
160 GET #1,A:GET #1,B:VNTP=A+B*256-256
:IF MEMLO<>VNT THEN 10000
170 GET #1,A:GET #1,B:VNTD=A+B*256-256
180 GET #1,A:GET #1,B:VVTP=A+B*256-256
190 GET #1,A:GET #1,B:STMTAB=A+B*256-2
56
200 GET #1,A:GET #1,B:STMCUR=A+B*256-2
56
210 GET #1,A:GET #1,B:STARP=A+B*256-25
6
220 NOTE #1,VNTSECT,VNTBYTE:NN=VVTP:GO
SUB 5000
230 NOTE #1,VVTSECT,VVTBYTE:NN=STMTAB-
VVTP:GOSUB 5000
240 NOTE #1,STMSECT,STMBYTE:NN=STMCUR-
STMTAB:GOSUB 5000
250 NOTE #1,CURSECT,CURBYTE:NN=STARP-S
TMCUR:GOSUB 5000
260 REM ** PRINT INFO TABLE **
270 GOSUB 80:POKE 752,1
280 POKE 82,2:? :? "  HEADER TABLE: OF
FSETS FROM LOMEM":? " ";:FOR I=1 TO 3
2:? CHR$(13);:NEXT I:?
290 ? :? "Current file: ";CHR$(34);FIL
E$;CHR$(34)
300 ? :? "Start of VARIABLE NAME TABLE
:   ";VNTP+256
310 ? "End of VARIABLE NAME TABLE:
 ";VNTD+256
320 ? "Start of VARIABLE VALUE TABLE:
 ";VVTP+256
330 ? "Start of STATEMENT TABLE:
 ";STMTAB+256
340 ? "CURRENT STATEMENT Pointer:
 ";STMCUR+256
350 ? "Last byte of program area:
 ";STARP+256-1
360 REM ** MENU CHOICE ROUTINE **
370 POSITION 2,18:IF MODE=0 THEN ? "Ke
y (1) to show Variable Name Table, "
380 IF MODE=1 THEN ? "Key (1) to print
 Variable Name Table,"
390 ? "     (2) for program line listin
g,":? " or ESC to select a new filespe
c"
400 POSITION 1,22:? "(Press the Space
Bar to toggle output":? "between the S
CREEN and the PRINTER)";
410 GET #3,OPT
420 IF OPT=32 THEN MODE=ABS(MODE-1):GO
TO 360
430 IF OPT=27 THEN 100
440 IF OPT<>49 AND OPT<>50 THEN ? CHR$
(253);:GOTO 410
450 POKE 82,0
460 IF MODE=0 THEN CLOSE #2:OPEN #2,8,
0,"E:":POKE 752,1
470 IF MODE=1 THEN CLOSE #2:OPEN #2,8,
0,"P:":? #2:GRAPHICS 0:POKE 752,1:? :?
 "          PRINTING - PLEASE WAIT"
480 IF OPT=49 THEN GOSUB 1000:REM FOR
VARIABLES
490 IF OPT=50 THEN GOSUB 2000:REM FOR
PRGRAM LINES
500 IF MODE=0 THEN ? :? :? "      <<<Pr
ess any key for menu>>>";:GET #3,OPT
510 GOTO 260
1000 REM ** SHOW VARIABLE DETAILS **
1010 ? #2;"  Variable Name Table of ";
FILE$
1020 SECT1=VNTSECT:BYTE1=VNTBYTE:SECT2
=VVTSECT:BYTE2=VVTBYTE:VARNO=0
1030 CH=0:POINT #1,SECT1,BYTE1:IF SECT
1=VVTSECT AND BYTE1=VVTBYTE THEN RETUR
N
1040 ? #2:? #2;VARNO;" ";:IF VARNO<10
THEN ? #2;" ";
1050 IF VARNO<100 THEN ? #2;" ";
1060 GET #1,A:IF A=0 THEN ? #2;"0
       END OF VARIABLE TABLE":RETURN
1070 IF A<128 THEN ? #2;CHR$(A);:CH=CH
+1:GOTO 1060
1080 A=A-128:NOTE #1,SECT1,BYTE1
1090 POINT #1,SECT2,BYTE2
1100 NN=8:GOSUB 5000
1110 NOTE #1,SECT2,BYTE2
1120 ? #2;CHR$(A);:CH=CH+1:GOSUB 1130:
VARNO=VARNO+1:GOTO 1030
1130 REM ** SHOW VARIABLE CONTENTS **
1140 IF CH<11 THEN ? #2;SPACE$(1,11-CH
);
1150 TYPE=ASC(BUFFER$)
1160 IF TYPE=64 THEN ? #2;" UN-DIMMED
ARRAY":RETURN
1170 IF TYPE=128 THEN ? #2;" UN-DIMMED
 STRING":RETURN
1180 IF TYPE>0 THEN 1280
1190 REM ** NUMERIC (BCD) VARIABLE **
1200 ? #2;" BCD NUMBER:";:MANT=PEEK(BU
F+2):IF MANT=0 THEN ? #2;" Zero":RETUR
N
1210 ? #2:? #2;SPACE$(1,17);:IF MANT>1
27 THEN MANT=MANT-128:? #2;"-";
1220 MANT=MANT-64:FOR I=BUF+3 TO BUF+7
1230 NN=PEEK(I):HI=INT(NN/16+0.1):LO=I
NT(NN-(HI*16)+0.1)
1240 ? #2;HI;LO;:IF I=BUF+3 THEN ? #2;
".";
1250 NEXT I
1260 IF MANT<>0 THEN ? #2;" x 100^";MA
NT:RETURN
1270 ? #2:RETURN
1280 IF TYPE<>65 THEN 1350
1290 REM ** PRINT ARRAY INFO **
1300 ? #2;" ARRAY:"
1310 ? #2;SPACE$(1,17);"Offset Address
 = ";PEEK(BUF+2)+PEEK(BUF+3)*256
1320 ? #2;SPACE$(1,17);"Dimension One
 = ";PEEK(BUF+4)+PEEK(BUF+5)*256-1
1330 NN=PEEK(BUF+6)+PEEK(BUF+7)*256-1:
IF NN>0 THEN ? #2;SPACE$(1,17);"Dimens
ion Two  = ";NN
1340 RETURN
1350 IF TYPE<>129 THEN RETURN
1360 REM ** PRINT STRING INFO **
1370 ? #2;" STRING:"
1380 ? #2;SPACE$(1,17);"Offset Address
 = ";PEEK(BUF+2)+PEEK(BUF+3)*256
1390 ? #2;SPACE$(1,17);"Current Length
 = ";PEEK(BUF+4)+PEEK(BUF+5)*256
1400 ? #2;SPACE$(1,17);"Maximum Length
 = ";PEEK(BUF+6)+PEEK(BUF+7)*256
1410 RETURN
2000 REM ** SHOW PROGRAM STATEMENTS **
2010 ? #2;"   PROGRAM STRUCTURE OF ";F
ILE$
2020 POINT #1,STMSECT,STMBYTE
2030 REM ** GET LINE NUMBER & SIZE **
2040 FINAL=0:GET #1,A:GET #1,B:LINE=A+
B*256
2050 GET #1,SIZE:NN=SIZE-3:GOSUB 5000
2060 ? #2:IF LINE=32768 THEN ? #2;"Las
t Immediate command";:FINAL=1:GOTO 208
0
2070 ? #2;"Line ";LINE;
2080 ? #2;" (";SIZE;" bytes long)":SEG
=0:CURR=0
2090 REM ** PRINT SEGMENT DETAILS **
2100 SEG=SEG+1:? #2;"  <";SEG;", Offse
t=";PEEK(ADR(BUFFER$)+CURR);">",
2110 REM ** GET & PRINT COMMAND **
2120 CURR=CURR+1:BYTE=PEEK(ADR(BUFFER$
)+CURR):CH=BYTE*10+1
2130 IF CMD$(CH,CH)<>CHR$(255) THEN ?
#2;CMD$(CH,CH);:CH=CH+1:GOTO 2130
2140 REM ** GET & PRINT EACH OP-BYTE *
*
2150 ? #2;" ";:IF BYTE=0 OR BYTE=1 OR
BYTE=55 THEN ? #2;"$$$+EOL":GOTO 2030
2160 CURR=CURR+1:BYTE=PEEK(ADR(BUFFER$
)+CURR)
2170 IF BYTE=14 THEN ? #2;"nnn";:CURR=
CURR+6:GOTO 2160
2180 IF BYTE=15 THEN ? #2;"$$$";:CURR=
CURR+PEEK(BUF+CURR+1)+1:GOTO 2160
2190 IF BYTE=22 THEN ? #2:IF FINAL=0 T
HEN GOTO 2030
2200 IF BYTE=22 THEN RETURN
2210 IF BYTE=20 THEN CURR=CURR+1:? #2:
GOTO 2090
2220 IF BYTE>127 THEN ? #2;"Var";BYTE-
128;:GOTO 2160
2230 CH=BYTE*10+1:OK=1:IF (BYTE>22 AND
 BYTE<28) OR (BYTE>40 AND BYTE<43) THE
N OK=0:? #2;" ";
2240 IF OP$(CH,CH)<>CHR$(255) THEN ? #
2;OP$(CH,CH);:CH=CH+1:GOTO 2240
2250 IF OK=0 THEN ? #2;" ";
2260 IF BYTE<>27 THEN 2160
2270 BYTE=PEEK(ADR(BUFFER$)+CURR+1):IF
 BYTE<>14 THEN ? #2:CURR=CURR+1:GOTO 2
090
2280 ? #2;"[GOTO] nnn":GOTO 2030
2290 GOTO 2160
5000 REM ** GET 'NN' BYTES ROUTINE **
5010 BUF=ADR(BUFFER$)
5020 IF NN>2500 THEN CIO=USR(ADR(BGET$
),1,BUF,2500,7):NN=NN-2500:GOTO 5020
5030 IF NN>0 THEN CIO=USR(ADR(BGET$),1
,BUF,NN,7)
5040 RETURN
6000 REM ** SETUP TOKEN STRINGS **
6010 VER=PEEK(43234)
6020 IF VER=162 THEN STATTAB=42159:OPT
AB=42979:REM REV A BASIC
6030 IF VER=234 OR VER=96 THEN STATTAB
=42143:OPTAB=42974:REM REV B/C BASIC
6040 IF OPTAB=0 THEN ? :? "   ERROR: N
OT REV A, B OR C BASIC":END
6100 REM ** SET UP COMMANDS STRING **
6110 NUM=0:ADDR=STATTAB:? :? "COMMANDS
: ";
6120 ADDR=ADDR+2
6130 ? "+";:IF PEEK(ADDR)=0 THEN 6200
```

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```
6140 CURR=NUM*10+1:NUM=NUM+1
6150 IF PEEK(ADDR)>127 THEN 6170
6160 CMD$(CURR,CURR)=CHR$(PEEK(ADDR)):
CURR=CURR+1:ADDR=ADDR+1:GOTO 6150
6170 CMD$(CURR,CURR)=CHR$(PEEK(ADDR)-1
28):CMD$(CURR+1,CURR+1)=CHR$(255):ADDR
=ADDR+1:GOTO 6120
6200 REM ** SETUP OPERATORS STRING **
6210 NUM=16:? :? :? "FUNCTIONS, ETC: "
;
6220 ADDR=OPTAB
6230 ? "+";:IF PEEK(ADDR)=0 THEN 6300
6240 CURR=NUM*10+1:NUM=NUM+1
6250 IF PEEK(ADDR)>127 THEN 6270
6260 OP$(CURR,CURR)=CHR$(PEEK(ADDR)):C
URR=CURR+1:ADDR=ADDR+1:GOTO 6250
6270 OP$(CURR,CURR)=CHR$(PEEK(ADDR)-12
8):OP$(CURR+1,CURR+1)=CHR$(255):ADDR=A
DDR+1:GOTO 6230
6300 REM ** ADD NON-PRINTING CODES **
6310 CMD$(541,545)="[LET]":CMD$(546,54
6)=CHR$(255)
6320 CMD$(551,557)="ERROR- ":CMD$(558,
558)=CHR$(255)
6330 OP$(161,161)=CHR$(34)
6340 OP$(171,171)=CHR$(255)
6350 OP$(561,561)="("
6360 OP$(571,571)="("
6400 REM ** SETUP M/CODE ROUTINE **
6410 I=1:? :? :? "M/CODE: ";
6420 ? "+";:READ A:IF A<>-1 THEN BGET$
(I,I)=CHR$(A):I=I+1:GOTO 6420
6430 RETURN
6500 REM ** M/CODE DATA **
6510 DATA 104,104,104,10,10,10,10,170,
104,157,69,3,104,157,68,3,104,157,73,3
6520 DATA 104,157,72,3,104,104,157,66,
3,32,86,228,132,212,169,0,133,213,96,-
1
10000 REM ** FILE ERROR **
10010 ? :? "  FILE FORMAT ERROR":END
```

Get it right!

			1120 HP8 (4)	2040 DXO (9)	6030 RTF (Q)
			1130 D8N (2)	2050 501 (2)	6040 155 (0)
			1140 9DT (9)	2060 UM5 (A)	6100 D2T (1)
			1150 ECA (D)	2070 CGD (G)	6110 JYK (0)
			1160 JNS (L)	2080 1SO (T)	6120 V28 (Y)
			1170 SDE (4)	2090 DHP (W)	6130 2HY (1)
			1180 HLN (5)	2100 8UV (M)	6140 SY4 (5)
			1190 DMN (1)	2110 D4P (J)	6150 SH4 (V)
			1200 13V (P)	2120 VW1 (M)	6160 ERF (4)
			1210 3W5 (V)	2130 702 (A)	6170 JU2 (V)
			1220 H17 (V)	2140 DAP (F)	6200 D6T (V)
			1230 91Q (T)	2150 60A (2)	6210 DFL (S)
			1240 DRU (8)	2160 3X9 (R)	6220 WJR (X)
10 CP1 (Y)	220 SWK (P)	430 DDQ (L)	1250 N9S (8)	2170 FM3 (6)	6230 2PY (1)
20 CP2 (3)	230 ELA (X)	440 VYX (5)	1260 1FH (1)	2180 FRY (S)	6240 T34 (4)
30 CP3 (X)	240 G3A (H)	450 S82 (E)	1270 WGE (P)	2190 8DN (7)	6250 SMD (4)
40 CP4 (4)	250 CNY (U)	460 W15 (A)	1280 SSP (S)	2200 20J (0)	6260 FDU (8)
50 DU5 (K)	260 DLT (N)	470 4A6 (C)	1290 DRN (V)	2210 X48 (0)	6270 N38 (E)
60 3H1 (U)	270 2NE (N)	480 UAS (E)	1300 274 (1)	2220 EYP (7)	6300 DAT (E)
70 AJR (S)	280 1C3 (J)	490 UG9 (T)	1310 POM (C)	2230 KK6 (W)	6310 LOU (Y)
80 SVW (D)	290 T6D (J)	500 S2F (X)	1320 CYU (J)	2240 RS7 (S)	6320 KNU (7)
90 JLU (U)	300 8PJ (2)	510 QJC (8)	1330 90H (C)	2250 G29 (1)	6330 F53 (N)
100 CUS (N)	310 1XO (Q)	1000 CXN (F)	1340 VXK (F)	2260 SVT (6)	6340 KC6 (5)
110 NFJ (7)	320 FW5 (P)	1010 621 (V)	1350 24Y (8)	2270 U2K (A)	6350 599 (0)
120 DEX (4)	330 CS3 (M)	1020 YSK (2)	1360 DPN (F)	2280 WSP (G)	6360 5EE (1)
130 HJ4 (2)	340 GDJ (F)	1030 3RX (S)	1370 74S (R)	2290 PTW (P)	6400 DFT (2)
140 YEF (Q)	350 VN6 (T)	1040 3SV (F)	1380 PFM (H)	5000 CXS (M)	6410 FHO (3)
150 EUV (4)	360 DLU (N)	1050 NW7 (4)	1390 S68 (T)	5010 D98 (L)	6420 VRV (C)
160 ER3 (X)	370 UF4 (2)	1060 KXQ (6)	1400 PJH (A)	5020 PTT (M)	6430 WOQ (C)
170 OW9 (U)	380 MLJ (P)	1070 2SF (G)	1410 VVK (E)	5030 P8S (X)	6500 DKT (8)
180 2JS (3)	390 ALG (7)	1080 HE1 (N)	2000 CXP (8)	5040 VKP (X)	6510 NNT (P)
190 4OL (H)	400 KP4 (D)	1090 E7A (1)	2010 GSG (C)	6000 CXT (Y)	6520 QPF (C)
200 2HM (8)	410 SQY (R)	1100 780 (W)	2020 03H (3)	6010 9GL (P)	10000 DO3 (9)
210 3MD (8)	420 Q4C (O)	1110 3DR (3)	2030 D4P (6)	6020 WU3 (4)	10010 4N5 (6)

MUG THE INDEPENDENT MicroLink User Group NEWSLETTER

Bulletin Board update

The MicroLink Bulletin Board has just had a spring clean, and a backlog of 9,000 old messages removed. But at the rate at which it's being used, it won't take more than a couple of months to replace them.

The Bulletin Board is an area where anyone can leave a public message, start or join in a discussion on any topic or just ask for help.

The range of subjects covered is huge and always changing; cars are bought and sold, philosophy, pop music and poaching argued about and the reasons why somebody's software doesn't seem to work are revealed.

There are even the occasional trivia quizzes (well, do YOU know how many electric tramways are still running in the UK?).

There's nothing quite like it outside the world of computers, but be warned. It can be very addictive.

Preparing for Prime time

EVERYONE upgrades their hardware occasionally, and MicroLink is no exception. But it's not an Amstrad PC1640 they're getting.

For some time now, the rate at which people are joining has put a bit of a strain on the old Prime 850 computer, and many users would agree that sluggish is perhaps a mild way to describe MicroLink at peak times.

Now work is underway to install a Prime 9955 – not only has it got a longer name but it's faster and better able to cope with the increased demand.

There's a lot of things to be done before the switchover can happen, software has to be changed and the digital detritus collected on the old computer in its years of dealing with us humans has to be cleared up.

Exactly how much better the new service will be isn't clear, although technical people tend to use words like "massively" and get quite excited.

We're all eager to find out . . .

The MicroLink User's Manual

ONE of the projects that MUG is coordinating is the production of the MicroLink User's Manual. Designed to complement the information given to every MicroLink subscriber on old fashioned paper, the manual sets out to be an online way of describing the many facilities available on MicroLink from the point of view of the people who use them.

At first, MicroLink can appear to offer a bewildering selection of things to try, and even for experienced users the different options can be confusing. And there's always a way to do things faster, or at less cost.

Of course, the information to help people do this has always existed. But it's been hard to find, and until now there hasn't really been any way for users to share their discoveries in such a way that others will be able to make use of them. The MicroLink User's Manual sets out to remedy this problem.

At the moment MUG is collating the information. Sometimes the amount of data collected by users can be staggering – one subscriber mailed in over 200k of hints and tips saved up over years. Of course, we're just as happy to hear from anyone with one good idea.

All the data will be indexed and made available; the exact design is still being discussed, but like anything else MUG does, it will be free to use.

User groups are good news

THE MicroLink Users' Group came about as a result of various subscribers asking whether there was any organisation run to help users.

User groups in any area are usually good news; they form a focus for ideas, opinion and self-help and give the users a collective voice.

The flexibility provided by MicroLink and Telecom Gold make MUG particularly useful. There are no printing costs for newsletters and there's almost instant access to everyone in the group through the mail system.

MUGs been going for about a month now, and we've already formed a team of people who have volunteered to answer queries and help anyone with MicroLink-related problems.

It's a small world . . .

. . . but full of Telecom Gold computers, it seems. The UK Telecom Gold system, of which MicroLink is the most active part, is just one sector of a global network called Dialcom.

While MicroLink is System 72, and other UK computers are in the range 70 to 90, there are Dialcom computers almost everwhere. And like international telephone exchanges, they've all got their own numbers.

MUGger Adrian Mars is trying to find out just which computers are where. This might seem an eccentric, if harmless, hobby, but such information as is available on MicroLink is difficult to find and (apparently) out of date.

And it could be the first step to organising an international group of Dialcom users, which really would be a first and another step towards the electronic community of tomorrow.

If you know anything about the Dialcom network numbering scheme, then Adrian (MARS.ADRIAN on the mail system) and MUG would be glad to hear from you . . .

Odd offers

THE prize for the most unusual use of MicroLink goes to . . . well, nobody knows. But the last month has seen some odd goings-on.

There have been people advertising for goose shooting, others looking for burned out buildings and the usual range of online floral orderings to persuade mothers and lovers that computers aren't so bad after all.

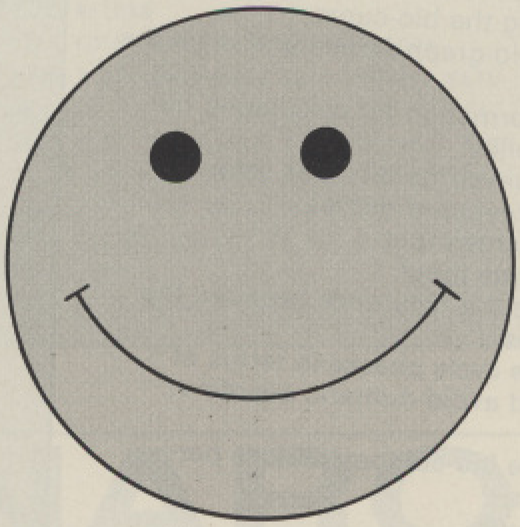
But you have to take your hat off, if nothing else, to Keith Channing. He helps run CORAL, Clothes Optional Recreation and Leisure, a naturlist organisation dedicated to promoting the various activities enjoyed by those who feel happier without their clothes on. And with a bit of advertising on the Bulletin Board and a touch of help from MicroLink themselves he's gathering together all those on the system who are similarly inclined.

Now that has to be the most original use for MicroLink.

Unless (of course) you know better...

Suggestions of material for inclusion in the MUG Newsletter should be sent to Rupert Goodwins on MAG95816

HAVE A Nice DAY



GREGORY BENHAM provides a routine to plot the ups and downs of your life

THIS easy-to-use program is based on a simple theory put forward by research scientists that the physical, mental and emotional states of the human body are constantly undergoing three fluctuating cycles.

These are very similar to each other but differ in their frequency. Physical, emotional and mental states have 23, 28 and 33 day periods respectively, so they are not usually in phase with each other.

They are said to be activated on the day we are born and controlled by a kind of built-in biological clock. The listing here represents these changing moods by sketching standard sinusoidal waves in graphical form for any month since a person's birth date.

The critical periods for us are at the highest and lowest peaks on the curves, when our moods will be correspondingly strong and weak. When all three peaks coincide we are therefore to be regarded as on the ball and buzzing or, in the second case, better off staying in bed all day.

Since these cycles apply to everyone it therefore means that the three biocycles are running parallel, but individually with those of other people with the same constant phase lag depending on the difference between their birth dates.

Biorhythm calculates this difference for each of the three categories and computes the combined average to give a figure as a percentage for how any two people's overall mood status compares, and hence determines their compatibility.

The three main screen displays are all different display lists stored in page 6 of memory enhanced by a customised character set used throughout. If you study lines 3000 to 3360 you will see a number of techniques used to make keyboard input easy yet idiot-proof.

When entering dates you must use the format DD/MM/YYYY: For example, 01/05/1988 or 1/5/1988 – the slash sign must separate the numbers. If you make a mistake the computer will either prompt you to re-enter the date or refuse to accept the input. You can erase any entry using the Delete key.

The program contains many useful routines which add to the overall presentation: A flashing cursor, a totally re-defined character set and display lists have been used wherever possible to enhance the graphic screens.

N.B. I cannot be held responsible if you run the program and find out that you are not compatible with your wife.

```
10 REM ********************
20 REM *    BIORYTHMS     *
30 REM *  BY GREG BENHAM *
40 REM *  (c)ATARI USER   *
50 REM ********************
100 DIM CS$(1024):GOSUB 9000
110 DIM IN$(20),M$(120),N$(37),N1$(37)
,N2$(37),DM(12),DY(12)
120 M$=" ":M$(120)=M$:M$(2)=M$:RESTORE
 160
130 FOR I=1 TO 12:READ D:DM(I)=D:NEXT
I
140 FOR I=1 TO 12:READ D:DY(I)=D:NEXT
I
150 FOR I=0 TO 11:READ IN$:M$(I*10+1)=
IN$:NEXT I:M$(119)="  "
160 DATA 31,28,31,30,31,30,31,31,30,31
,30,31,1,32,60,91,121,152,182,213,244,
274,305,335
170 DATA JANUARY,FEBRUARY,MARCH,APRIL,
MAY,JUNE,JULY,AUGUST,SEPTEMBER,OCTOBER
,NOVEMBER,DECEMBER
180 FOR I=1536 TO 1653:READ D:POKE I,D
:NEXT I
190 FOR I=1654 TO 1721:POKE I,13:NEXT
I
200 FOR I=1722 TO 1755:READ D:POKE I,D
:NEXT I:X=USR(1536)
210 DATA 104,165,9,41,1,240,14,165,12,
141,43,6,165,13,141,44,6,169,1,133,9,1
69,39,133,12,169,6
220 DATA 133,13,162,6,160,45,169,7,32,
92,228,96,32,29,6,76,77,160,165,87,208
,26,206,78,6,208
230 DATA 21,160,0,165,93,81,94,41,127,
208,6,177,94,73,128,145,94,169,32,141,
78,6,76,98,228,32
240 DATA 112,112,112,73,0,140,9,9,9,9,
9,9,9,7,7,7,6,6,6,6,6,2,2,2,2,2,2,2,2,
2,65,79,6
250 DATA 112,112,112,70,0,128,2,6,6,6,
6,2,65,112,6
260 DATA 112,112,112,71,0,146,7,7,7,7,
7,7,2,2,2,2,2,2,2,2,2,2,65,195,6
270 GRAPHICS 0:? CHR$(125):CLOSE #1:PO
KE 708,206:POKE 709,0:POKE 710,14:POKE
 711,42:POKE 712,134
280 POKE 764,255:POKE 756,RAMTOP:POKE
88,0:POKE 89,140
290 POKE 560,79:POKE 561,6:POKE 87,4
300 CHBAS=PEEK(756)*256:TOPSCR=PEEK(88
)+PEEK(89)*256
310 RESTORE 340:FOR COL=0 TO 9:READ CS
ET:FOR I=0 TO 7
320 POKE TOPSCR+(I*10)+10+COL,PEEK(CHB
AS+I+(CSET*8))
330 NEXT I:NEXT COL
340 DATA 34,41,47,50,40,57,52,40,45,51
350 POKE 87,2:POKE 88,119:POSITION 6,0
:? #6;"Main  Menu"
360 POKE 87,1:POKE 88,180:POSITION 3,0
:? #6;"DO YOU WANT TO-"
370 POKE 87,0:POKE 88,242:? :? "   [1]
 Calculate a Bio-curve":? "   [2] Calc
ulate Compatibility"
380 ? "   [3] Exit from program":? :?
"please press required number key"
390 OPEN #1,4,0,"K:"
400 GET #1,K:K=K-48:IF K<1 OR K>3 THEN
 400
```

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```
410 ON K GOTO 1000,2000,450
420 GOTO 270
450 CLOSE #1:? CHR$(125):POKE 87,2:POKE 88,100:POKE 755,0:POKE 710,134
460 POSITION 8,0:? #6;"by":POSITION 4,1:? #6;"greg benham"
470 POKE 87,1:POKE 88,180:POSITION 2,0:? #6;"for 'ATARI USER'"
480 LIN=480:FOR DEL=1 TO 70:NEXT DEL:GOTO 5000
1000 GRAPHICS 0:POKE 755,2:POKE 709,12:POKE 710,112:POKE 712,112:POKE 756,RAMTOP:GOSUB 3000
1010 ? CHR$(125):? "Enter Birth-date":GOSUB 3200
1020 D1=D:M1=M:Y1=Y:IF ERR THEN GOSUB 3500:ERR=0:GOTO 1010
1030 POSITION 2,8:? "Enter today's date":GOSUB 3200
1040 D2=D:M2=M:Y2=Y:IF ERR THEN GOSUB 3500:ERR=0:GOTO 1030
1050 IF Y1>Y2 THEN 1090
1060 IF M1>M2 AND Y1=Y2 THEN 1090
1070 IF D1>=D2 AND M1=M2 AND Y1=Y2 THEN 1090
1080 GOTO 1100
1090 GOSUB 3500:GOTO 1010
1100 GOSUB 3600:IF ERR THEN ERR=0:GOTO 1010
1110 GOSUB 4000:DAYS=DAYS-D2:GOSUB 4200:YR=Y2:ND=DM(M2):IF M2=2 AND LP3 THEN ND=LP3
1120 LP3=0:OPEN #2,4,0,"S:":DEG :POKE 756,RAMTOP
1130 POKE 560,112:POKE 561,6:POKE 87,1:POKE 88,0:POKE 89,128
1140 POSITION 3,0:? #6;M$(M2*10-9,M2*10);YR:POKE 87,7
1150 POKE 88,20:POKE 89,138:COLOR 2:FOR I=4 TO 154 STEP 5:PLOT I,0:DRAWTO I,4:PLOT I+1,0:DRAWTO I+1,4:NEXT I
1160 POKE 87,0:POKE 88,180:POKE 752,1:POSITION 0,0:? "[illegible]";
1170 POKE 87,1:POKE 88,220:POSITION 0,1:? #6;" PHYSICAL emotional        MENTAL"
1180 POKE 87,7:POKE 88,20:POKE 89,128:COLOR 1:POKE 708,136:POKE 709,204:POKE 710,54:POKE 712,178
1190 PLOT 0,0:DRAWTO 0,63:DRAWTO 159,63:PLOT 0,31:DRAWTO 159,31:COLOR 2:PLOT 2,15:DRAWTO 4,15
1200 PLOT 3,14:DRAWTO 3,16:PLOT 2,47:DRAWTO 4,47
1210 CL=23:PC=(360/CL)*PM:C=1:GOSUB 1300
1220 CL=28:PC=(360/CL)*EM:C=2:GOSUB 1300
1230 CL=33:PC=(360/CL)*MM:C=3:GOSUB 1300
1240 POKE 87,0:POKE 88,44:POKE 89,139:POSITION 4,0:? "Press any key to return to menu":LIN=1250:GOTO 5000
1250 GET #1,K:CLOSE #1
1260 POKE 87,1:POKE 88,0:POKE 89,128:POSITION 3,0:? #6;"                  "
1270 POKE 87,7:POKE 88,20:? #6;CHR$(125):CLOSE #2:GOTO 270
1300 PI=ATN(1)*4:PD=PI/180:LG=(360*ND)/CL
1310 COLOR C:PLOT 2,-SIN(PC*PD)*30+31
1320 FOR I=0 TO LG STEP 7
1330 X=INT((155*I*ND/31/LG)+2.5):Y=-SIN((I+PC)*PD)*30+31:SOUND 0,Y,12,4
1340 DRAWTO X,Y:NEXT I:SOUND 0,0,0,0:RETURN
2000 GRAPHICS 0:POKE 709,12:POKE 710,112:POKE 712,112:POKE 755,2:POKE 756,RAMTOP:GOSUB 3000
2010 N1$="":? "↓Enter 1st person's name":GOSUB 3100:N1$=N$:N$=""
2020 ? "↓↓Enter Birth-date":GOSUB 3200:D1=D:M1=M:Y1=Y
2030 IF ERR THEN GOSUB 3500:ERR=0:GOTO 2020
2040 GOSUB 3600:IF ERR THEN ERR=0:GOTO 2000
2050 ? CHR$(125):N2$="":? "↓Enter 2nd person's name":GOSUB 3100:N2$=N$:N$=""
2060 ? "↓↓Enter Birth-date":GOSUB 3200:D2=D:M2=M:Y2=Y
2070 IF ERR THEN GOSUB 3500:ERR=0:GOTO 2060
2080 GOSUB 3600:IF ERR THEN ERR=0:GOTO 2000
2100 IF D1=D2 AND M1=M2 AND Y1=Y2 THEN ? :? "↓SAME DATE!!":FOR DEL=1 TO 200:NEXT DEL:GOTO 2180
2110 IF Y1>Y2 THEN GOSUB 2170
2120 IF Y1<Y2 THEN 2180
2130 IF M1>M2 THEN GOSUB 2170
2140 IF M1<M2 THEN 2180
2150 IF D1>D2 THEN GOSUB 2170
2160 GOTO 2180
2170 D3=D1:D1=D2:D2=D3:M3=M1:M1=M2:M2=M3:Y3=Y1:Y1=Y2:Y2=Y3:DF=1:RETURN
2180 CLOSE #1:GOSUB 4000:GOSUB 4200
2200 POKE 560,195:POKE 561,6:POKE 755,0
2210 POKE 708,42:POKE 709,138:POKE 710,0:POKE 711,202:POKE 712,0:? CHR$(125)
2220 POKE 87,2:POKE 88,1:POKE 89,146:POSITION 1,0:? #6;"compatibility %"
2230 ? #6;" -------------":? #6
2240 ? #6;"physical------";(INT(ABS(PP)*10+0.5))/10
2250 ? #6;"emotional-----";(INT(ABS(EP)*10+0.5))/10
2260 ? #6;"mental--------";(INT(ABS(MP)*10+0.5))/10
2270 ? #6;"average-------";(INT(ABS(AP)*10+0.5))/10
2300 POKE 87,0:POKE 88,140:POSITION 2,1:? N1$:? :? N2$
2310 POSITION 3,5:? "Press 'C' for more compatibilities":? "        'M' to return to menu":LIN=2320:GOTO 5000
2320 K=PEEK(764):IF K<>18 AND K<>37 THEN 2320
2330 POKE 764,255:POKE 87,2:POKE 88,0
2340 FOR I=3 TO 6:POSITION 15,I:? #6;"    ":NEXT I
2350 POKE 87,0:POKE 88,140:FOR I=0 TO 9:POSITION 0,I:? "          ":NEXT I
2360 GRAPHICS 0:IF K=37 THEN DF=0:GOTO 270
2370 IF DF THEN D1=D3:M1=M3:Y1=Y3:DF=0
2380 POKE 755,2:POKE 709,12:POKE 710,112:POKE 712,112
2390 POKE 756,RAMTOP:OPEN #1,4,0,"K:":GOTO 2050
3000 POKE 694,0:IF PEEK(16)>127 THEN POKE 16,(PEEK(16)-128)
3010 RETURN
3020 POKE 85,PEEK(85)-1:? " ";:POKE 85,PEEK(85)-1
3030 IF I=0 THEN RETURN
```

PROGRAM BREAKDOWN

100 – 260	Read the data into variables and the Display List data into page 6
270 – 420	Display the menu screen
450 – 480	Find the end of the program display
1000 – 1110	Enter information to be used in calculating the bio-curve
1120 – 1340	Display bio-graph screen and draw the curves
2000 – 2180	Enter information for calculating bio-compatibility
2200 – 2310	Display bio-compatibilities screen
3000 – 3070	Control keyboard entries
3100 – 3160	Accept name input
3200 – 3360	Accept date input
4000 – 4100	Calculate the difference between the two dates
4200 – 4290	Calculate cycle phases in terms of days and avoid numeric overflow errors
4300 – 4330	Calculate bio-compatibility as percentages
5000 – 6170	Play a tune
9000 – 9160	Set-up the new character set

```
3040 IF N=0 THEN N=3:I=I-1:N=N-((I=1)
AND (D<10))-((I=2) AND (M<10)):IF I=0
THEN I=1:N=1:POKE 85,1
3050 IF I=1 AND DE THEN IN$=STR$(D):IN
$(N)="    "
3060 IF I=2 AND ME THEN IN$=STR$(M):IN
$(N)="    "
3070 RETURN
3100 I=0:N=1:?
3110 IF N<1 THEN N=1:POKE 85,1
3120 GOSUB 3000:GET #1,K:IF K=155 THEN
 ? :RETURN
3130 IF N>37 THEN ? :? "▯↓Name too lon
g-please re-enter":? :GOTO 3100
3140 IF (K<65 OR K>122) AND K<>32 AND
K<>126 OR (K>90 AND K<97) THEN 3120
3150 IF K=126 THEN N=N-1:GOSUB 3020:GO
TO 3110
3160 ? CHR$(K);:N$(N)=CHR$(K):N=N+1:GO
TO 3120
3200 I=1:N=1:DE=0:ME=0:? "↓Enter date
in the form DD/MM/YYYY":?
3210 IN$="0"
3220 IF I=3 AND N=5 THEN 3270
3230 TRAP 3360:POKE 702,64:GET #1,K
3240 IF K=126 THEN N=N-1:GOSUB 3020:GO
TO 3220
3250 IF K<47 OR K>57 THEN 3220
3260 ? CHR$(K);:IF K<>47 THEN IN$(N,N)
=STR$(K-48):N=N+1:GOTO 3220
3270 ON I GOSUB 3300,3320,3340:IF ERR
THEN RETURN
3280 N=1:I=I+1:IF I>3 THEN RETURN
3290 GOTO 3210
3300 D=VAL(IN$):DE=1:IF D<1 OR D>31 TH
EN 3360
3310 RETURN
3320 M=VAL(IN$):ME=1:IF M<1 OR M>12 TH
EN 3360
3330 RETURN
3340 Y=VAL(IN$):IF LEN(IN$)<>4 OR Y<17
72 THEN 3360
```



```
3350 RETURN
3360 GOSUB 3400:TRAP 40000:RETURN
3400 ? :? "▯↓Invalid Date!":ERR=1:RETU
RN
3500 ? :? "▯↓Incorrect Entry!":FOR DEL
=1 TO 500:NEXT DEL:? CHR$(125):RETURN
3600 ? :? "↓Is this correct (Y/N) ";
3610 GET #1,K:IF K<>78 AND K<>89 THEN
3610
3620 IF K=78 THEN ERR=1
3630 RETURN
4000 DAYS=(Y2-Y1)*365
4010 FOR I=Y1 TO Y2:LP1=I-(INT(I/4)*4)
:LP2=I-(INT(I/100)*100)
4020 IF LP1=0 AND LP2<>0 THEN DAYS=DAY
S+1:IF I=Y2 THEN LP3=29
4030 NEXT I
4040 IF Y2-(INT(Y2/4)*4)=0 AND Y2-(INT
(Y2/100)*100)<>0 THEN 4070
4050 N1=DY(M1)+D1-1:N2=DY(M2)+D2-1
4060 DAYS=DAYS-N1+N2:RETURN
4070 FOR I=3 TO 12:DY(I)=DY(I)+1:NEXT
I
4080 N1=DY(M1)+D1-1:N2=DY(M2)+D2-1
4090 DAYS=DAYS-N1+N2
4100 FOR I=3 TO 12:DY(I)=DY(I)-1:NEXT
I:RETURN
4200 DEYS=DAYS
4210 IF DAYS>31993 THEN DEYS=DAYS:MD=2
3:GOSUB 4400
4220 PM=DAYS-INT(DAYS/23)*23
4230 IF DEYS>31993 THEN I=DAYS:DAYS=DE
YS:DEYS=I
4240 IF DAYS>31976 THEN DEYS=DAYS:MD=2
8:GOSUB 4400
4250 EM=DAYS-INT(DAYS/28)*28
4260 IF DEYS>31976 THEN I=DAYS:DAYS=DE
YS:DEYS=I
```

Utility

◄ From Page 17

```
4270 IF DAYS)31977 THEN DEYS=DAYS:MD=3
3:GOSUB 4400
4280 MM=DAYS-INT(DAYS/33)*33
4290 IF DEYS)31977 THEN I=DAYS:DAYS=DE
YS:DEYS=I
4300 PP=100-ABS((200/23)*PM)
4310 EP=100-ABS((200/28)*EM)
4320 MP=100-ABS((200/33)*MM)
4330 AP=(ABS(PP)+ABS(EP)+ABS(MP))/3:RE
TURN
4400 DAYS=DAYS/MD-INT(DAYS/MD):DAYS=IN
T((DAYS*MD)+0.5):RETURN
5000 POKE 764,255:GOTO 5050
5010 FOR H=1 TO T:READ V0,V1,V2,V3:SOU
ND 0,V0,10,8:SOUND 1,V1,10,8:SOUND 2,V
2,10,8:SOUND 3,V3,10,8
5020 FOR DEL=1 TO 5:IF PEEK(764)<>255
THEN POP :GOTO 5100
5030 NEXT DEL:NEXT H:RETURN
5040 RESTORE 6000:T=8:GOSUB 5010
5050 RESTORE 6010:T=56:GOSUB 5010:VERS
=VERS+1:IF VERS=2 THEN 5080
5060 IF VERS=3 THEN VERS=0:GOTO 5090
5070 GOTO 5040
5080 T=72:GOSUB 5010:GOTO 5050
5090 RESTORE 6170:T=5:GOSUB 5010
5100 FOR H=0 TO 3:SOUND H,0,0,0:NEXT H
:GOTO LIN
6000 DATA 0,0,0,193,128,0,0,0,0,0,0,0,
144,0,0,0,153,0,0,255,0,0,0,0,173,0,0,
204,0,0,0,0
6010 DATA 153,0,0,193,0,0,0,0,128,153,
0,0,128,0,0,0,114,144,173,255,0,0,0,0,
0,0,0,0,96,0,0,0
6020 DATA 96,114,153,173,0,0,0,0,85,0,
0,0,0,0,0,0,0,102,0,128,0,0,0,0,0,0,0,
0,0,0,0,0
6030 DATA 0,0,0,153,0,0,0,0,85,102,128
,0,85,102,128,0,0,0,0,153,96,0,0,0,0,1
14,136,162,0,0,0,0
6040 DATA 114,0,0,173,114,0,0,0,0,144,
0,0,128,0,0,0,0,0,0,255,0,0,0,0,0,144,
173,0,0,144,173,0
6050 DATA 0,0,0,153,0,0,0,0,128,0,0,0,
128,0,0,0,114,0,0,162,0,0,0,0,0,136,0,
0,96,0,0,0
6060 DATA 96,114,144,173,0,114,144,0,8
5,0,0,0,0,0,0,0,0,102,121,144,72,102,1
21,0,72,102,121,0,85,0,0,0
6070 DATA 76,102,128,153,0,0,0,0,76,10
2,128,0,0,0,0,128,85,102,144,255,76,0,
0,0,85,0,0,255,96,128,153,0
6080 DATA 0,0,0,193,64,0,0,0,57,0,0,0,
50,0,0,0,47,0,0,255,45,0,0,0,42,0,0,0,
40,0,0,0
6090 DATA 37,42,50,241,0,0,0,0,0,0,0,0
,0,0,0,0,0,0,0,228,0,0,0,0,37,42,50,0,
0,0,0,0
6100 DATA 37,42,0,215,37,42,0,0,0,0,0,
0,35,42,0,0,0,0,0,204,0,0,0,0,0,0,0,0,
0,0,0,0
6110 DATA 0,0,0,182,28,0,0,0,28,0,0,0,
0,0,0,0,31,37,0,193,37,45,0,0,45,57,0,
0,50,64,0,0
6120 DATA 57,0,0,204,64,76,0,0,76,91,0
,0,85,102,0,0,91,114,0,228,102,128,0,0
,108,144,0,0,114,153,0,0
6130 DATA 0,0,0,136,85,96,114,0,0,0,0,
0,0,0,0,0,0,0,0,128,0,0,0,0,85,96,114,
0,0,0,0,0
6140 DATA 85,96,0,121,85,96,0,0,0,0,0,
0,81,96,114,0,0,0,0,114,0,0,0,0,0,0,0,
0,0,0,0,0
6150 DATA 25,31,0,215,23,38,0,0,20,28,
0,0,31,42,0,0,26,33,0,228,25,31,0,0,35
,47,0,0,33,45,0,0
6160 DATA 31,42,0,241,47,57,0,0,45,53,
0,0,43,50,0,0,50,64,0,255,53,68,0,0,57
,72,0,0,60,76,0,0
6170 DATA 193,0,0,0,68,0,0,0,64,0,0,0,
47,0,0,0,0,0,0,0
9000 RAMTOP=PEEK(106)-8:POKE 106,RAMTO
P-4:VADR=PEEK(134)+PEEK(135)*256:STADR
=PEEK(140)+PEEK(141)*256
9010 OFFSET=RAMTOP*256-STADR:HI=INT(OF
FSET/256):LO=OFFSET-HI*256:POKE VADR+2
,LO:POKE VADR+3,HI
9020 CS$(1,80)="♥♥♥♥♥♥♥♥88┴┴♥┴┴♥nnDD♥♥
♥♥♥♣(◢◢♣ 8♥_ H |◣┤♥f1┴0fF♥♥♥├|┘♥♥♥┴┴┴
♥♥♥♥┘┴┴0┴┴┘ ♥0┴┴┘ ┴┴0♥"
9030 CS$(81,160)="♥♥♥♥♥♥♥♥♥┴┴(┴┴♥♥♥♥♥♥
♥┴┴0♥♥♥(♥♥♥♥♥♥♥♥♥♥┴┴♥┘/"┴0♦●♥)ccccc)♥8┴
┴┴))>♥)┘┘)♦♦)♥\//)\\)♥"
9040 CS$(161,240)="ppppw)\♥)♦♦)┘┘)♥)♦♦
)cc)♥)┘┘+┴┴┴♥)66)ww)♥)cc)\\\♥♥♥♥  ■e♥
♣( 0((♣♥_ H◢◢◢♥├||├||├"
9050 CS$(241,320)="♥♥♥♥♥♥♥)c┘+♥♥♥♥e■
■♦ ■e+'g)ggg♥(ff)gg)♥)gg♦cc)♥(ffwww)♥)
♦♦)pp)♥)♦♦)ppp♥)c♦ogg)♥"
9060 CS$(321,400)="ggg)ggg♥)♥♥♥♥♥)♥"""
__n(♥ffl)ggg♥♦♦♦pps)♥g))wggg♥gw)oggg♥)
ccggg)♥)cc)ppp♥)ccggg)\"
9070 CS$(401,480)="(ff)www♥)♦)┘ss)♥)♥♥
♥♥♥♥ggggggg)♥gggo)♥ggko))'♥sss)ggg♥g
gg)♥♥♥♥)f1┴7g)♥(┴┴888)♥"
9080 CS$(481,560)="♥D■JJJJ■x┴┴♥♥♥|♥◢♥
6c♥♥♥♥♥♥♥♥■♥♥r3rrrr;♥┘'┤┤┤┤■♥A■!!A■♥
8◢♣◢◢■♥B■JJNB■♥+2+♣♣—9"
9090 CS$(561,640)="♥F┤■■L♥A■■■■■C♥8◢
♣ ■♥D■JDJJ■♥r2—r┴—9♥ ■■F_♥A■■■■C♥
♣■■♣♣■♥D■ D■■♥+(◢♣ 9"
9100 CS$(641,720)="♥|■ ■F_♥!b■ ■ #♥8■
■◢(■♥D■(,J■♥+(◢— :♥|■|H◢_♥A■■e■■C♥
♣■■◢(■♥■*J**■D♥9'r..)+"
9110 CS$(721,800)="♥♥♥♥♥♥♥■x♦x♦(┴(♥♥┴(
(┴┴┴♥♥┴┴┴(<┴♥♥┴0(0┴♥♥♥┘ (' ┴♥♥♥┴<((<┴♥♥
♥> |(v(♥♥♦♦(fn(♥♥♥)20:)♥"
9120 CS$(801,880)="///(fv(♥♥♥(f(p(♥♥(┴
)┴♥♥♥♥(fv(/(♦♦♦(fvv♥♥┴♥┴┴♥♥♥♥' ♥" __(♥
006|vw♥♥┴┴┴(((♥♥♥f))kc♥"
9130 CS$(881,960)="♥♥|fvvv♥♥♥(fvv(♥♥♥(
fv(♦♦♥♥(fn(//♥♥)0888♥♥♥) )_(♥♥┴(┴♥♥♥♥
♥ffnn(♥♥♥fnn)♥♥♥♥ck)>6♥"
9140 CS$(961,1024)="♥♥f)┴)n♥♥♥fff(_(♥♥
(♥┴6(♥♥┴(((┴<♥♥e■eee■♥(x|nf/♥◢┴8x8┴◢♥
♣┴♥(♥┴♥♥"
9150 RESTORE 9160:FOR I=1 TO 5:READ D:
CS$(D,D)=CHR$(34):NEXT I:RETURN
9160 DATA 628,629,639,655,679
```

Get it right!

10 CP1 (Y)	420 QQA (9)	1340 OXT (X)	3000 71K (N)	3630 W8M (J)	5100 WFL (V)
20 CP2 (3)	450 OG1 (9)	2000 M7E (A)	3010 VDM (K)	4000 5K4 (4)	6000 O6C (Q)
30 CP3 (X)	460 6XG (C)	2010 3QD (M)	3020 CV5 (6)	4010 EV2 (S)	6010 AJF (P)
40 CP4 (4)	470 M17 (G)	2020 L9V (1)	3030 EP4 (C)	4020 RRA (K)	6020 YHW (5)
50 CP5 (Y)	480 N5Y (F)	2030 R2O (1)	3040 K8W (Q)	4030 MWV (Q)	6030 G9N (E)
100 PFK (O)	1000 KX4 (R)	2040 L2V (R)	3050 LKJ (T)	4040 5PU (5)	6040 CAU (3)
110 S1C (O)	1010 OQX (O)	2050 R09 (L)	3060 MTT (T)	4050 W8J (G)	6050 YJK (O)
120 C76 (A)	1020 QD2 (6)	2060 LM5 (V)	3070 VRM (V)	4060 TS7 (T)	6060 U26 (J)
130 EYA (U)	1030 PR8 (5)	2070 RTO (Y)	3100 VR1 (G)	4070 FHR (H)	6070 VM9 (5)
140 FUA (D)	1040 QJ9 (G)	2080 LAV (5)	3110 NGH (U)	4080 WFJ (S)	6080 XSA (3)
150 9RJ (9)	1050 9CQ (V)	2100 5S9 (X)	3120 RVT (X)	4090 8S6 (8)	6090 WF2 (2)
160 67V (5)	1060 RDO (L)	2110 PPH (4)	3130 HDD (5)	4100 OXP (Q)	6100 VR6 (P)
170 CGH (9)	1070 JFN (V)	2120 970 (E)	3140 4FX (W)	4200 V9N (D)	6110 17O (T)
180 NXV (N)	1080 PCV (7)	2130 PF4 (1)	3150 NXY (P)	4210 7GC (3)	6120 TT7 (M)
190 8VR (S)	1090 DX5 (V)	2140 8XM (Y)	3160 A7U (R)	4220 SW5 (Y)	6130 XKW (5)
200 89N (P)	1100 L2S (1)	2150 P8U (T)	3200 DGL (T)	4230 2G9 (3)	6140 YH3 (Y)
210 LW3 (W)	1110 8AK (G)	2160 PJW (1)	3210 MNR (7)	4240 81W (E)	6150 CHQ (O)
220 L31 (7)	1120 NSM (J)	2170 C56 (6)	3220 MGA (S)	4250 T5Q (G)	6160 DQF (U)
230 LT7 (5)	1130 EA6 (G)	2180 6YD (9)	3230 YVJ (O)	4260 317 (X)	6170 HC5 (Y)
240 3Q1 (P)	1140 8J8 (O)	2200 XNL (E)	3240 P3Y (A)	4270 8CJ (M)	9000 638 (D)
250 G6V (8)	1150 547 (2)	2210 9CK (6)	3250 KY1 (Q)	4280 TAJ (6)	9010 3RY (P)
260 CMM (P)	1160 4X5 (T)	2220 WYW (U)	3260 WSF (C)	4290 3C7 (M)	9020 N7J (S)
270 EUP (P)	1170 U10 (F)	2230 F3V (3)	3270 LSK (A)	4300 N6C (1)	9030 8AG (D)
280 ALT (4)	1180 DN1 (W)	2240 33S (L)	3280 X6P (X)	4310 LT7 (T)	9040 YVG (C)
290 6U2 (T)	1190 R3P (P)	2250 9KS (V)	3290 PUF (P)	4320 MWU (1)	9050 JC7 (K)
300 8UP (A)	1200 P33 (T)	2260 OHX (3)	3300 KWA (E)	4330 Q2Q (8)	9060 H7J (E)
310 GGE (8)	1210 7VC (P)	2270 Q6S (3)	3310 VRM (C)	4400 29S (O)	9070 1SD (P)
320 7PQ (T)	1220 8K5 (5)	2300 OKO (3)	3320 KXP (C)	5000 HT5 (J)	9080 LP6 (P)
330 DR6 (D)	1230 816 (K)	2310 QP8 (P)	3330 VVM (E)	5010 LN7 (T)	9090 FPX (K)
340 XO5 (Q)	1240 GMD (M)	2320 KGL (X)	3340 VRW (G)	5020 9UL (4)	9100 LWJ (M)
350 1XD (H)	1250 85H (K)	2330 1GW (Q)	3350 WOM (8)	5030 SV8 (S)	9110 MWR (2)
360 QLA (Q)	1260 VXF (P)	2340 QTD (V)	3360 XUH (Q)	5040 OC4 (N)	9120 U3U (W)
370 LUL (Q)	1270 DUR (4)	2350 U8W (V)	3400 HCC (4)	5050 ADW (1)	9130 S1R (V)
380 X7T (4)	1300 CKT (1)	2360 MTX (P)	3500 JXF (S)	5060 8LQ (F)	9140 CTU (3)
390 5TE (L)	1310 3VS (V)	2370 9XF (M)	3600 DVR (O)	5070 PLO (L)	9150 EG6 (9)
400 74L (W)	1320 DD8 (L)	2380 1SL (U)	3610 H22 (Y)	5080 LNS (O)	9160 FMK (N)
410 LXT (Y)	1330 AQV (D)	2390 H2K (4)	3620 862 (N)	5090 OM6 (N)	

PICTURE PUZZLE

ALAN BATES presents a highly entertaining routine for jigsaw fans

OVER the years many programs have been written that load 62 sector uncompressed picture files and then allow you to alter them. However, none of them has ever let you to simulate a jigsaw puzzle.

Jigsaw is a program which does just that. When it is first run you are presented with the title page – shown in Figure I – that tells you how to alter the colours of the picture once it has been loaded.

Next you are prompted to place a disc containing AtariArtist picture files into a drive. Pressing any key will give you a directory of the disc – only files with the extension .JIG will be displayed.

You are prompted for the number of pieces – 8, 32 or 128 – you want the jigsaw to consist of and once the picture is loaded you press Return for the computer to juggle the pieces.

A square cursor appears on the screen above the top left-hand pieces and it can be moved using a joystick plugged into port one.

Place the cursor over the initial piece to swap and press fire. Now move it to the piece you wish to swap it with and press fire again. If you have moved to the correct place within the jigsaw you'll hear a beep.

When the whole puzzle has been completed correctly the computer displays a short message and then returns you to the disc directory section of the program.

That's all there is to it – so have fun making jigsaws with your favourite pictures.

Keys	Function
0-3	Select colour
C	Changes the selected colour
–, =	Change a colour's luminance

Figure I: Colour selection options

```
10 REM JIGSAW
20 REM BY A. BATES
30 REM (C)ATARI USER
40 ? CHR$(125):? "PLEASE WAIT"
50 GOSUB 770
60 GOSUB 660
70 GRAPHICS 0:POKE 82,1
80 POSITION 17,1:? "JIGSAW":POSITION 9
,2:? "Uses Atariartist files":? "Inser
t picture disk then press any key"
90 POKE 764,255
100 ? :GET #2,A:OPEN #1,6,0,"D1:*.JIG"
110 TRAP 120:INPUT #1,FILE$:? "    ";F
ILE$(3,10):GOTO 110
120 POKE 84,PEEK(84)-1:? "
 "

130 CLOSE #1:? :? :? "Enter Atariartis
t filename";:FILE$="D1:":INPUT A$:FILE
$(4)=A$:FILE$(LEN(A$)+4)=".JIG"
135 ? CHR$(125):SETCOLOR 2,0,0
140 ? "Jigsaw sizes available:":? :? "
1) 8 pieces":? "2) 32 pieces":? "3) 12
8 pieces"
145 ? :? "ENTER YOUR CHOICE 1,2 OR 3"
150 INPUT N:N=INT(N):IF N<1 OR N>3 THE
N 150
160 TRAP 130
170 OPEN #1,4,0,FILE$:GRAPHICS 24:POKE
 559,0:X=USR(ADR(LD$)):CLOSE #1:IF X>=
128 THEN ? "Error ";X;" on disk":GOTO
110
180 YC=12:XC=16:Y0=17:X0=52:IF N=1 THE
N YC=48:XC=40:Y0=35:X0=64
190 IF N=2 THEN YC=24:XC=20:Y0=24:X0=5
4
200 POKE 203,80/(8*N):POKE 204,96/N:IF
 N=3 THEN POKE 203,4:POKE 204,24
210 POKE 703,4
220 DP=PEEK(88)+256*PEEK(89)-1:HE=PEEK
(204):WI=PEEK(203):N=0
230 FOR Y=1 TO 80:P$(Y,Y)=" ":NEXT Y
240 FOR Y=0 TO 192-HE STEP HE
250 FOR X=0 TO 40-WI STEP WI
260 P$(((Y/HE)*10)+X/WI+1)=CHR$(N):N=N
+1
270 NEXT X:NEXT Y:POKE 559,42:POKE 764
,255:D$=P$
280 POKE RR,C+L:P=PEEK(764):L=L+((P=14
)*2)-((P=15)*2):IF L=-2 THEN L=14
290 IF L=16 THEN L=0
300 IF P=31 THEN RR=708:GOSUB 650
310 IF P=30 THEN RR=709:GOSUB 650
320 IF P=26 THEN RR=710:GOSUB 650
330 IF P=50 THEN RR=712:GOSUB 650
340 IF P=255 THEN 280
350 SOUND 0,10,10,14:IF PEEK(53775)=25
1 THEN 350
360 IF P=18 THEN C=C+16:IF C=256 THEN
C=0
370 POKE 764,255:SOUND 0,0,0,0:IF P<>1
2 THEN 280
380 POKE 559,0
390 FOR Y=0 TO 192-HE STEP HE
400 FOR X=0 TO 40-WI STEP WI
410 Y1=INT(RND(0)*(192/HE))*HE:X1=INT(
RND(0)*(40/WI))*WI:T=DP+X1+Y1*40:F=DP+
X+Y*40:N=USR(ADR(SW$),F,T)
420 U=(((Y/HE)*10)+X/WI+1):V=(((Y1/HE)
*10)+X1/WI+1):N=ASC(P$(U,U)):P$(U,U)=P
$(V,V):P$(V,V)=CHR$(N)
430 NEXT X:NEXT Y
440 POKE 559,42
450 X=X0:Y=Y0:N=1
460 POKE 53248,X:V=USR(ADR(M$),R+Y2,R+
Y)
470 S=PEEK(632):X=X+((S=7)-(S=11))*XC:
N=N+(S=7)-(S=11)
480 Y2=Y:Y=Y+((S=13)-(S=14))*YC:N=N+((
S=13)-(S=14))*10
490 IF X<50 THEN X=X+XC:N=N+1
500 IF X>196 THEN X=X-XC:N=N-1
510 IF Y<15 THEN Y=Y+YC:N=N+10
520 IF Y>101 THEN Y=Y-YC:N=N-10
530 SOUND 0,0,0,0:POKE 77,0
540 IF PEEK(644)=1 THEN 460
550 IF PEEK(644)=0 THEN 550
560 IF J=0 THEN J=1:POKE 53249,X:V=USR
(ADR(M$),R+128+YY,R+128+Y):XX=X:YY=Y:N
1=N:GOTO 460
570 YF=INT((N-1)/10)*40*HE+DP:XF=(((N-
1)/10-INT((N-1)/10))*10)*WI
580 YT=INT((N1-1)/10)*40*HE+DP:XT=(((N
1-1)/10-INT((N1-1)/10))*10)*WI
590 V=USR(ADR(SW$),YF+XF,YT+XT):POKE 5
3249,0:J=0:G=ASC(P$(N1,N1)):P$(N1,N1)=
P$(N,N):P$(N,N)=CHR$(G)
600 IF P$(N1,N1)=D$(N1,N1) OR P$(N,N)=
D$(N,N) THEN SOUND 0,96,10,14
610 IF P$<>D$ THEN 460
620 FOR V=255 TO 0 STEP -1:SOUND 0,V,1
0,14:NEXT V:SOUND 0,0,0,0:POKE 53248,0
630 FOR V=1 TO 500:NEXT V:GRAPHICS 0:?
 :? "CONGRATULATIONS !!!":? "You have
completed this JIGSAW"
640 ? "PRESS ANY KEY TO CONTINUE...":P
OKE 764,255:GET #2,V:GOTO 70
```

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◀ From Page 19

```
650 C=INT(PEEK(RR)/16)*16:L=PEEK(RR)-C
:RETURN
660 GRAPHICS 17
670 ? #6;"        jigsaw":? #6
680 ? #6;" FOLLOW THE BUILT ININSTRUCT
IONS TO LOADA PICTURE.":? #6
690 ? #6;" ONCE THE PICTURE   HAS LOAD
ED USE THE  FOLLOWING KEYS TO   CHANGE
 THE COLOURS:":? #6
700 ? #6;" 0-3SELECT COLOUR"
710 ? #6;" C  CHANGE COLOUR"
720 ? #6;" -,=CHANGE LUMINANCE":? #6:?
 #6
730 ? #6;" return TO CONTINUE"
740 GET #2,A
750 RETURN
760 GOTO 760
770 DIM LD$(117),SW$(61),FILE$(17),A$(
8),P$(80),D$(80),M$(32):POKE 106,PEEK(
106)-16:R=PEEK(106)*256+512
780 POKE 53277,2:POKE 559,42:POKE 5427
9,PEEK(106)
790 FOR I=0 TO 256:POKE I+R,0:NEXT I
800 POKE 704,200:POKE 705,52:POKE 623,
0
810 FOR X=1 TO 117:READ N:LD$(X)=CHR$(
N):NEXT X
820 FOR X=1 TO 61:READ N:SW$(X)=CHR$(N
):NEXT X
830 FOR X=1 TO 32:READ N:M$(X)=CHR$(N)
:NEXT X
840 OPEN #2,4,0,"K:":RETURN
850 DATA 216,104,173,48,2,24,105,3,133
,203,173,49,2,105,0,133,204,160,0,177,
203,201,79,208,21
860 DATA 169,78,145,203,165,203,24,105
,2,133,203,165,204,105,0,133,204,169,0
,240,14,201,15,208,6
870 DATA 169,14,145,203,208,4,201,65,2
40,17,165,203,24,105,1,133,203,165,204
,105,0,133,204,169,0
880 DATA 240,198,162,16,169,7,157,66,3
,169,0,157,72,3,169,30,157,73,3,165,88
,157,68,3,165
890 DATA 89,157,69,3,32,86,228,189,67,
3,133,212,169,0,133,213,96
900 DATA 216,104,104,133,206,104,133,2
05,104,133,208,104,133,207,166,204,164
,203,177,205,72,177,207,145,205,104
910 DATA 145,207,136,208,243,165,207,2
4,105,40,133,207,165,208,105,0,133,208
,165,205,24,105,40,133,205,165,206
920 DATA 105,0,133,206,202,208,212,96
930 DATA 104,104,133,206,104,133,205,1
04,133,208,104,133,207,169,0,160,8,145
,205,136,208,251
940 DATA 169,255,160,8,145,207,136,208
,251,96
```

Get it right!

10 CP1 (Y)	150 CE4 (H)	310 Y61 (H)	470 OXN (6)	630 F4Y (X)	790 6NO (8)
20 CP2 (3)	160 RO5 (K)	320 YJ5 (T)	480 X1E (R)	640 2QT (J)	800 2XR (N)
30 CP3 (X)	170 H24 (6)	330 YNE (T)	490 V4X (T)	650 VAU (X)	810 V84 (F)
40 Q5H (5)	180 KHG (M)	340 328 (G)	500 QUU (8)	660 X16 (S)	820 052 (D)
50 RFN (7)	190 6RT (6)	350 J9P (3)	510 UH9 (7)	670 T5C (S)	830 VJ1 (U)
60 R8P (6)	200 VAO (J)	360 C33 (Q)	520 QNJ (O)	680 46C (1)	840 QFL (6)
70 AKN (2)	210 S20 (S)	370 QT9 (2)	530 GVP (8)	690 RY1 (Y)	850 JVX (E)
80 QPP (M)	220 MNC (1)	380 T51 (F)	540 LAE (A)	700 WRY (2)	860 P3F (S)
90 SJ8 (P)	230 540 (8)	390 QPR (6)	550 L6F (8)	710 UYK (4)	870 M6D (A)
100 61G (J)	240 Q2Q (7)	400 MSX (9)	560 DF1 (F)	720 7RW (U)	880 AQW (P)
110 UXL (J)	250 NEV (D)	410 22J (K)	570 AGV (V)	730 RAM (H)	890 6G9 (V)
120 QMU (5)	260 53U (H)	420 2TO (T)	580 PGC (S)	740 QN2 (3)	900 EAC (S)
130 XNH (R)	270 T74 (4)	430 OOW (E)	590 YUP (D)	750 RTC (G)	910 DAS (A)
135 MDK (M)	280 OQO (1)	440 SVA (8)	600 SJ7 (D)	760 RSE (T)	920 VDJ (8)
140 X41 (9)	290 8TQ (M)	450 OE9 (J)	610 9LY (W)	770 MU6 (K)	930 K37 (D)
145 AKP (C)	300 Y3W (P)	460 GQQ (S)	620 CGF (C)	780 MUT (P)	940 A8S (J)



It's a challenge!

OVER the last couple of months we have been outlining a problem for you to solve – together with some hints on how to go about writing a program to give the required answer.

I asked you to test out a roulette gambling strategy: To bet on the red numbers and, if you lost, to keep doubling the bet until you won. Many of you will have written your own routines to solve the puzzle, and mine is shown below. It follows the method described last month, but is just one of the infinite ways that you may have approached it.

If you've solved the problem in a completely different way we'd like to see it, so send it to:

Mailbag, Atari User, Europa House, Adlington Park, Adlington, Macclesfield, SK10 4NP.

We'll give £10 for the best solution that matches exactly the problem as it was originally defined in the March issue of Atari User.

In the third part of this series Mike Cook presents his solution

I HAVE kept the program to solve the gambling problem simple. When run, an evening at the roulette table just flies by. Line 100 defines how much money you have in your pot, with line 110 setting the size of the initial bet. If you like, you can put input statements in both those lines to vary the amounts when run. We can keep track of the largest bet we have placed with the variable *LBET*.

Next we read in all the red numbers from the DATA statements into the array *RED()*. The casino might close before we are through so the total number of spins of the wheel possible is tracked in the variable *TSP*. Similarly the number of spins actually used is recorded in *SPIN*. A logic variable *BUST* indicates if we have enough money to cover our bet and line 210 sets up the victory pot – the amount we have when we decide to give up for the night.

So now we enter the casino and start our first cycle of bets. Line 330 generates the random number as a result of spinning the roulette wheel. Lines 340 to 370 see if we have won and then we must take the appropriate action if we have won or lost. If we have won we add our winnings to our pot and end the current cycle of bet doubling. If we have lost we need to double our bet if we have enough money – if not we are bust.

Then if the casino is still open we can place our bet again. After a winning cycle of bets we decide whether to call it a night or carry on.

So there you have it: You can see whether you will win. I made an adjustment to the program to run it continuously – keeping a count of how many nights I won and lost. I kept a record of 1,000 spins of the wheel and won 531 times.

However, before you rush off to win a fortune consider a few more points. First of all most casinos have house rules which limit the maximum and minimum bets and some tables limit the number of times you can double your bet. In addition you will have to subtract your entrance fee and any drinks you buy from your winnings. Some casinos might not get through as many as 200 spins a night, so you will have to change that.

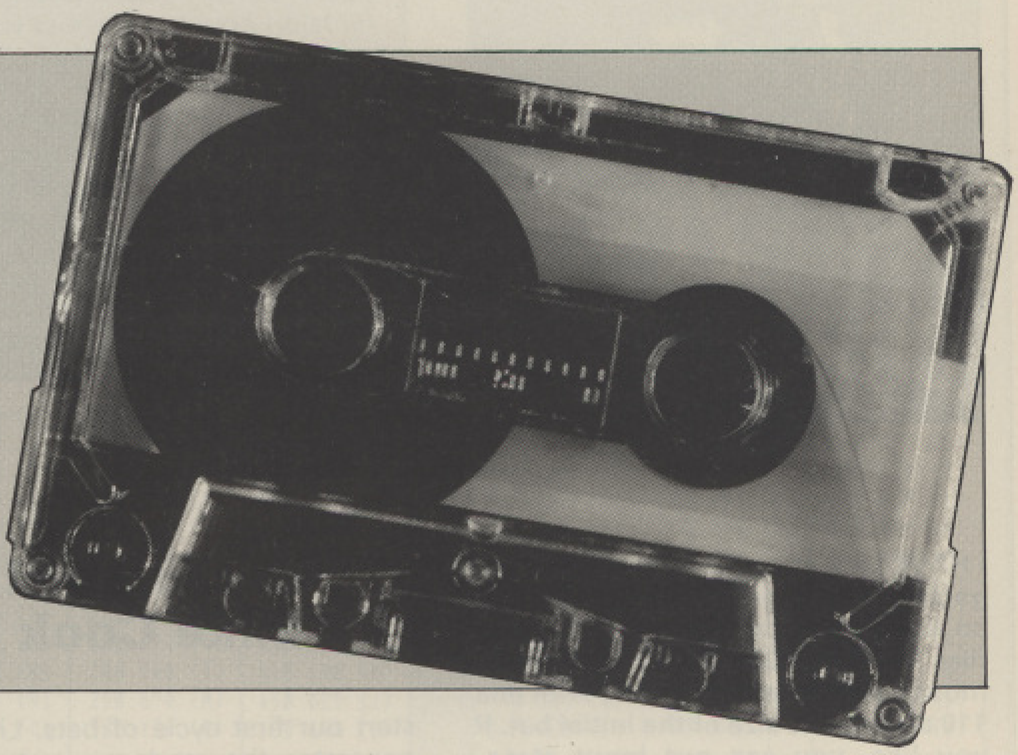
Finally, it is rather a slow and boring way to make money. It's much better to hone your programming skill and make that pay.

So are you ready for next month's Programmers' Challenge?

```
10 REM PROGRAMMER'S CHALLENGE
20 REM THE SOLUTION
30 REM TO THE PROBLEM
40 REM (c)ATARI USER
50 GRAPHICS 0:SETCOLOR 2,0,0
60 POSITION 2,2:? "PROGRAMMER'S CHALLE
NGE":?:?
70 POSITION 2,3:? "________________
__":?:?
80 ? "THE ROULETTE WHEEL"
90 ? "(c)ATARI USER"
100 POT=100:TRUE=-1:FALSE=0
110 FBET=1
120 LBET=0
130 REM NOW INITIALISE RED NUMBERS
140 DIM RED(18)
150 FOR A=1 TO 18:READ X
160 RED(A)=X
170 NEXT A
180 DATA 15,4,2,17,6,13,11,8,10,24
190 DATA 33,20,31,22,29,28,35,26
200 VIPC=POT*2
210 TSP=200
220 SPIN=0
230 BUST=FALSE
240 REM NOW ENTER THE CASINO
250 REM A NEW CYCLE OF BETS
260 BET=FBET
270 REM THE LOOP RETURNS HERE
280 SPIN=SPIN+1
290 POSITION 2,10:? "SPIN NUMBER ";SPI
N:?
300 ? "YOUR BET IS $";BET;"  "
310 IF BET>LBET THEN LBET=BET
320 TSP=TSP-1
330 S=INT(RND(0)*37)
340 WIN=FALSE
350 FOR A=1 TO 18
360 IF S=RED(A) THEN WIN=TRUE
370 NEXT A
380 IF WIN=TRUE THEN ? "YOU WIN "
390 IF WIN<>TRUE THEN ? "YOU LOSE "
400 IF WIN=TRUE THEN POT=POT+(BET*2):G
OTO 440
410 REM WE MUST HAVE LOST TO BE HERE
420 BET=BET*2:BUST=TRUE
430 IF POT>BET THEN POT=POT-BET:BUST=F
ALSE
440 ? "YOU HAVE $";POT;"  "
450 IF WIN=TRUE THEN 490
460 IF BUST=TRUE THEN 490
470 IF TSP=0 THEN 490
480 GOTO 270
490 REM DO WE EMBARK ON ANOTHER ROUND?
500 IF BUST=TRUE THEN 540
510 IF (POT>=VIP) THEN 540
520 IF (TSP=0) THEN 540
530 GOTO 240
540 ? "THE LARGEST BET PLACED WAS $";L
BET
550 END
```

Missing in Oxide

Load and save errors? LEN GOLDING gives answers to prayers with a verify utility



THE Atari cassette system is beautifully designed and always works perfectly every time. And if you believe that you'll believe anything.

How often have you typed in a long program and CSAVEd it, only to find later that there's a fault on the tape? A cassette file can be tested in only one way – by trying to load it. But this destroys the original program in memory, so if the file happens to be faulty you've lost all your hard work.

All kinds of things can go wrong. The connecting plug may have worked loose, especially since terminals are fitted to only five of the 13 pins. There may be dead spots on the tape – perhaps from too much re-recording – and some tapes designed to record music are inherently unreliable when used for computer data.

The cassette unit itself can develop hardware faults – keys get stuck, heads get dirty or drift out of alignment and drive capstans develop flat spots – especially if you leave the recorder for long periods with Play locked down.

On some older computers there's a bug in the operating system which interferes with the cassette handler routine – the usual fix for this is to do an LPRINT before saving anything to cassette, and ignore the ERROR 138.

There's even the possibility of pilot error – you might have forgotten to plug the recorder in or, on 410 models, left the power supply disconnected, or neglected to press both Play and Record.

The cassette handler has no way of knowing what, if anything, is plugged into the serial port – you could attach an electric toothbrush, for all it cares.

Whatever the cause, the result is likely to be ERROR 143, described in the manuals as a Dataframe checksum error and in more colourful language by users who have to endure it.

This little autoboot program provides an answer. It simulates the CLOAD or LOAD "C:" or ENTER "C:" commands, without disturbing the contents of memory. You will hear the bleeps and whistles from the TV speaker, just as though the file was loading as usual, and any problems are therefore easy to detect.

But if a fault occurs your original Basic program will still be there in memory, so you can keep on trying until you produce a perfect copy.

Making the autoboot cassette file is very easy – Program I does it all for you. Lines 20 to 140 are identical to

```
10 REM Program 1: Creates an Autoboot
cassette file containing the Verify ro
utine.
20 BFR=(PEEK(106)-24)*256:REM reserve
a safe area at the top of RAM as a tem
porary buffer
30 FOR X=0 TO 46:READ D:POKE 1536+X,D:
NEXT X:REM Load the new SAVE routine i
nto page 6
40 DATA 104,104,133,204,104,133,203,10
4,133,206,104,133,205,162,16,169,11,15
7,66,3
50 DATA 165,203,157,68,3,165,204,157,6
9,3,165,205,157,72,3,165,206,157,73,3
60 DATA 32,86,228,96,67,58,155
70 REM Load the program temporarily in
to the reserved buffer space
80 X=0:RESTORE 150
90 READ D:IF D=-1 THEN 120
100 POKE BFR+X,D:X=X+1:GOTO 90
110 REM Now read the data from the tem
porary buffer into an Autoboot cassett
e file
120 OPEN #1,8,128,"C:"
130 X=USR(1536,BFR,PEEK(BFR+1)*128)
140 END
150 DATA 0,2,0,7,13,7,169,60,141,2,211
,24,96,169,134,141,231,2,169,7
160 DATA 141,232,2,169,148,141,200,2,9
6,104,208,6,104,104,169,128,48,2,169,0
170 DATA 162,112,157,75,3,169,3,157,66
,3,169,4,157,74,3,169,131,157,68,3
180 DATA 169,7,157,69,3,32,86,228,48,3
9,162,112,169,7,157,66,3,169,253,157
190 DATA 68,3,169,3,157,69,3,169,128,1
57,72,3,169,0,157,73,3,32,86,228
200 DATA 16,224,140,130,7,192,136,240,
5,169,158,141,252,2,162,112,169,12,157
,66
210 DATA 3,32,86,228,169,3,141,15,210,
96,0,67,58,155,-1
```

10 CP1 (Y)	80 6RR (G)	150 DYH (S)
20 Q2U (9)	90 GFR (W)	160 RP8 (M)
30 VMO (7)	100 21F (S)	170 KKV (G)
40 OFW (3)	110 CYS (Q)	180 RQ7 (4)
50 RF2 (1)	120 1V1 (F)	190 GY6 (X)
60 J7K (U)	130 3V9 (2)	200 T18 (D)
70 CP7 (2)	140 DK1 (P)	210 N3S (A)

Listing I: Autoboot creator

those used in several previous cassette autoboot routines we explained in our articles in *Atari User*, so you may already have a file with them on. The DATA at lines 40 to 60 holds the autoboot creator code and lines 150 onwards contain the Verify routine itself.

Type in Program I and – with fingers crossed – CSAVE a copy. Insert a blank, fully re-wound cassette and run the program. After a few seconds you will hear the familiar double beep. Now follow the usual CSAVE procedure and the machine code routine will be written to cassette in autoboot format. From now on you'll use this new tape, so Program I shouldn't be needed any more. But keep it in case you've made any typing errors and need to change it later.

Before you can use the Verify routine however, it has to be loaded into memory. Re-wind the tape with the autoboot program on it, switch power off then switch on again while holding down the Start key. When the single beep sounds, proceed as for CLOAD and the autoboot program will install itself before Basic takes control, changing the screen border colour to prove it.

Incidentally, if you don't like the colour change, replace the 148 at line 160 with 0 and make a new autoboot tape. You can always double-check that the routine is installed, by typing PRINT PEEK(1821) – the result should be 104.

You can now carry on programming just as though the new routine wasn't there. When you've finished use the usual CSAVE, SAVE"C:" or LIST"C:" commands, and your program will be saved to tape.

Now's the time to check that it's a good copy. If the file was made using CSAVE, then type X=USR(1821). This simulates CLOAD, with its short inter-record gaps. If you used SAVE "C:" or LIST "C:", then type X=USR(1821,1). This lets the routine work with long inter-record gaps, to simulate LOAD "C:" or ENTER "C:".

In all cases the file is loaded 128 bytes at a time into the cassette buffer. A top-notch Verify routine would check each byte against the Basic program in memory. However, this would make the code much more complex, and greatly increase the autoboot loading time. Apart from which, it's extremely rare for just one or two bytes to be corrupted – if the file will load at all, it's almost certain to be a good copy.

To keep things simple and minimise typing, we've taken the soft option – our routine simply reads the file and does nothing with it. During the reading process you will hear the usual sounds from your TV speaker, so any problems are easy to detect and any fault will produce an extra loud beep. When the test is either successfully completed or aborted the cassette motor is switched off and control passes straight back to Basic, which prints the usual READY message.

If you're desperate to discover what type of error occurred, you can find out by typing PEEK (1922). An error-free file will leave 136 here, but any fault will insert its own identity number – usually 143.

Once you have a cassette copy which tests out successfully you should be safe to try loading it back into your micro's memory using CLOAD, LOAD"C:" or ENTER"C:" as appropriate. The Verify routine does not need to be in memory for this operation, though it can be if you wish. And that's all there is to checking that you've made a good copy of your program on your tape.

HOW THE PROGRAM WORKS

If you're into machine code you might like to take a look at the source listing. If nothing else, it will remind you what a cassette autoboot file looks like. The header starts with 0, then contains the file length in 128-byte sectors, followed by the load address and intitialisation address.

On power-up, and before Basic takes control, the operating system does a JSR to the sixth byte after *LOADADR*. This puts it at *COLDST* where the cassette motor is turned off and the Carry flag cleared to indicate a successful boot.

The RTS at line 300 returns control to the operating system, which then does a JSR to the initialisation address. This resets *MEMLO* and changes the screen border colour to let you know that the routine is installed. Pressing Reset repeats the JSR to *INIT*, reinstating the new *MEMLO* and border colour values.

The RTS at line 380 hands control to Basic, leaving the rest of the machine code routine safely tucked away and ready for your USR command.

The USR routine itself starts at line 410 with a PLA to detect whether or not a parameter was inserted. If not, it assumes that the file to be checked uses short IRGs. If any parameter was passed then long IRGs are selected. The specified mode is programmed by storing either *$80* or *$0* into the second auxiliary byte of *IOCB #7*. We chose this IOCB since it's the one used by the operating system for most external I/O transactions.

Lines 630 to 750 load the file, 128 bytes at a time, into the area reserved for cassette I/O – *CASBUF*. So long as no error occurs, the 6502 processor's Sign flag remains at zero until the end-of-file. Consequently line 750 will loop back for another chunk of data. When the reading process stops for any reason the Sign flag is set, so the routine drops through to *ENDTST* with the error number automatically stored in the 6502's Y register.

If it's error *$88* – end of file – everything is alright, so we exit via *CLOSEIT* without beeping the speaker. If the error number is anything other than *$88*, lines 810 and 820 simulate the pressing of Control+2 on the keyboard, and this produces a beep. The error number is copied into *ERRHOLD* at address $782 – decimal 1922 – in case you need to inspect it when Basic gets control again.

The last few instructions from 840 to 890 close *IOCB #7* and ensure that there will be no continued whistling from the speaker when cassette I/O is finished. Control is then handed back to Basic by the final RTS.

```
10 CASBUF=$3FD
20 CH=$2FC
30 CIOV=$E456
40 CLOSE=$0C
50 COLOR4=$2C8
60 EOL=$9B
70 GETCHR=$07
80 ICAX1=$34A
90 ICAX2=$34B
0100 ICBAL=$344
0110 ICBLL=$348
0120 ICCOM=$342
0130 IOCB=$70
0140 LOADADR=$700
0150 MEMLO=$2E7
0160 OPEN=$03
0170 PACTL=$D302
0180 SKCTL=$D20F
0190  *=LOADADR
0200 ;
0210 HEADER
0220  .BYTE 0
0230  .BYTE FINISH-LOADADR+127/128
0240  .WORD LOADADR
```

Turn to Page 24 ▶

Listing II: Machine-code version of Program I

◄ From Page 23

```
0250  .WORD INIT
0260 COLDST
0270  LDA #$3C          Turn cassette
motor off
0280  STA PACTL
0290  CLC               Indicate succe
ssful boot
0300  RTS               End of 1st sta
ge boot
0310 INIT
0320  LDA #FINISH&255   Reset MEMLO to
 protect
0330  STA MEMLO         the area of RA
M containing
0340  LDA #FINISH/256   our machine co
de
0350  STA MEMLO+1
0360  LDA #$94          Change border
colour, to
0370  STA COLOR4        show routine i
s installed
0380  RTS               Return to Basi
c
0390 ;
0400 VERCODE
0410  PLA
0420  BNE LSTFORM       Branch if no p
arameter
0430  PLA
0440  PLA               Any parameter
means
0450  LDA #$80          short IRG mode
0460  BMI OPENIT
0470 LSTFORM
0480  LDA #0            No parameter =
 long IRG mode
0490 OPENIT
0500  LDX #IOCB         Open #7 to rea
d characters
0510  STA ICAX2,X       in appropriate
 IRG mode
0520  LDA #OPEN
0530  STA ICCOM,X
0540  LDA #$04
0550  STA ICAX1,X
0560  LDA #FILENM&255
0570  STA ICBAL,X
0580  LDA #FILENM/256
0590  STA ICBAL+1,X
0600  JSR CIOV
0610  BMI ERROR
0620 LOOP
0630  LDX #IOCB         Read file in 1
28-byte
0640  LDA #GETCHR       chunks into ca
ssette buffer
0650  STA ICCOM,X       but do nothing
 with
0660  LDA #CASBUF&255   the data.
0670  STA ICBAL,X
0680  LDA #CASBUF/256
0690  STA ICBAL+1,X
0700  LDA #$80
0710  STA ICBLL,X
0720  LDA #0
0730  STA ICBLL+1,X
0740  JSR CIOV
0750  BPL LOOP          Branch if no e
rror
0760 ENDTST
0770  STY ERRHOLD       Store error nu
mber
0780  CPY #$88          $88 means end-
of-file
0790  BEQ CLOSEIT
0800 ERROR
0810  LDA #$9E          Any other erro
r number
0820  STA CH            beeps the spea
ker
0830 CLOSEIT
0840  LDX #IOCB         Close #7
0850  LDA #CLOSE
0860  STA ICCOM,X
0870  JSR CIOV
0880  LDA #$03          Stop the whist
ling noise
0890  STA SKCTL         that sometimes
 occurs
0900  RTS               Return from US
R call
0910 ;
0920 ERRHOLD
0930  .BYTE 0
0940 FILENM
0950  .BYTE "C:",EOL
0960 FINISH=*
```

Software Scene

Thunder from the heavens...

Product: Thunderfox
Price: £4.99 (cassette)
Supplier: Atari Corp (UK), Atari House, Railway Terrace, Slough, Berkshire SL2 5BZ.
Tel: 0753 33344

A HEAVILY armed enemy transporter ship is carrying Disilicate energy crystals for the approaching Phalon mothership.

Once these have been installed in the deadly Phalon war machine they will turn it into the most powerful destructive force in the Universe. Capable of destroying entire solar systems in minutes, it must be stopped.

You have been chosen to represent the Federation forces. The new Thunderfox – an ultra-sleek and incredibly manoeuvrable space fighter – has been given to you in a last ditch attempt to destroy this evil threat to mankind.

All you have to do is locate the crystals and destroy them to stop the war machine from being finished. They are situated inside the transporter and are guarded by the crystal guardian: Obvious if you think about it.

Your way into the transporter is restricted by two anti-gravity stabilisers located at the far right of the ship. You must bomb each five times before it is destroyed – not an easy task even for an avid games player.

It is very easy to run out of bombs while you're trying to knock out the stabilisers so an option to reload is built into the game.

When you have used all your bombs, fly to the far left hand of the transporter and land on your mothership where your supply will be refurbished.

When you have destroyed both stabilisers, fly to the left of the transporter and land on the pad. You will then be transported to the bowels of the ship and enter the thermonuclear laser room.

If you come into contact with any of the lasers or the walls you will be instantly disintegrated.

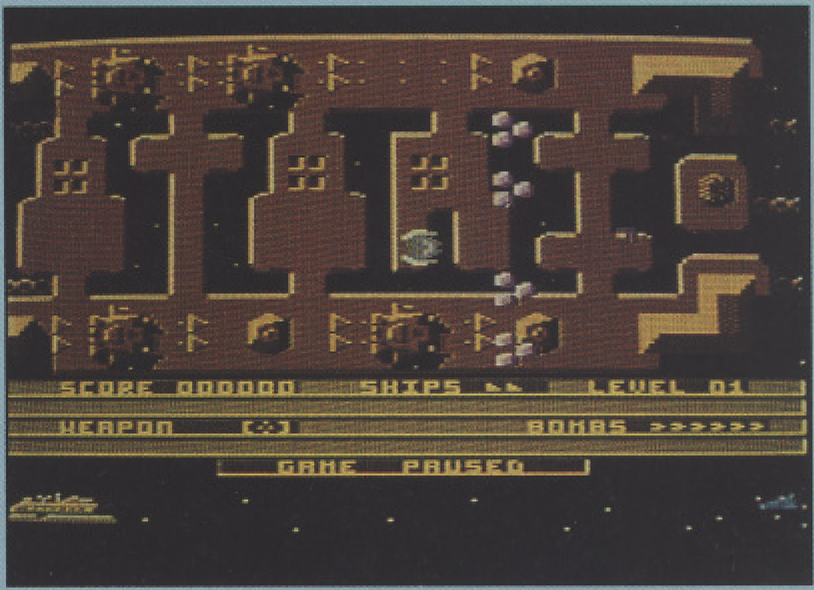
Remember to watch the level indicator at the top of the screen. The intense radiation generated by the lasers will destroy your Thunderfox if you take too long getting through.

Once you manage to get past the lasers you enter the energy crystal room where the guardian is waiting for you.

The Disilicate crystal is located in its head and you must shoot it 10 times to blow it up. This is hindered by the mobile wall that moves up and down in front.

The playfield uses a split screen and in the bottom quarter is the long range scanner – which indicates how close the Phalon war machine is to the transporter.

This distance is constantly closing, so time is of the essence – don't mess around shooting enemy



vessels that you can just ignore. Also at the bottom of the screen is a status line showing your score, lives remaining, weapon in use and the current level.

The main action takes place at the top of the screen.

An extra ship is awarded for every 5,000 points scored, and your total score is calculated depending on a number of factors, such as destroying the guardian head and blowing up ground installations.

The game is joystick controlled, allowing you four directions of movement – up, down, left and right. If you are travelling flat out when you push forward or backwards you will accelerate or decelerate relative to the movement.

However, when your craft is moving at its slowest speed, when you pull in the opposite direction it will flip over and reverse its travel.

The fire button is used to activate the on-board lasers but it also switches from lasers and bombs when you hold it down and move in the opposite direction.

The graphics are nice with lovely scrolling. The sound effects are well implemented and there is a catchy main tune.

When your fighter launches from its hangar you get a superb side on view of it – an original feature. Also, when your craft is hit by enemy fire it doesn't explode staight away. It plummets to the surface of the transporter – another nice idea.

The game is quite difficult to get to grips with, but after the initial hiccups it got me hooked. I would recommend Thunderfox to lovers of shoot-'em-ups.

Neil Fawcett

Sound	7
Graphics	8
Playability	7
Value for money	8
Overall	7

Winter frolics...

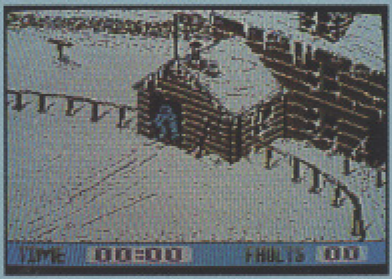
Program: Winter Olympiad '88
Price: £9.95 (cassette), £14.95 (disc)
Supplier: Tynesoft, Unit 3, Addison Industrial Estate, Blaydon, Tyne and Wear NE21 4DE.
Tel: 091-414 4611

COMING hot on the heels of the recent Winter Olympics is this new sports simulation from Tynesoft.

Although this style of game is now a little old hat, and similar ones were on the scene at least 12 months ago – notably Winter Games by Epyx – this fresh product from Tynesoft has a lot going for it.

It kicks off with a lively rendition of the signature tune from the BBC Ski Sunday program, then offers up to six players the chance to participate in any or all of five different events – the downhill race, ski jump, biathlon, slalom and bobsled.

Each player can represent any country from 12 given, although this has little bearing on the game. The selection process is followed by a picture of the Olympic flame in full blaze and then it's on to the simulation itself.



The Downhill

All the events rely on judicious and timely joystick waggling to control the participant's movements and, sometimes, speed.

In the downhill race you view your skier from behind as he prepares to hurl himself down the slope. The objective is to manoeuvre him in and out of trees and sundry obstacles and deposit him safely across the finish line.

It's not easy and, since you only get the one attempt, mistakes such as creaming yourself on a sitka spruce are costly – not to mention probably fatal.

Next comes the ski jump. If you ever thought you could do better than Eddie the Eagle, now's your chance.

Your man shuffles out from a hut and positions himself at the top of the long and menacing ramp: Your view is from behind him. Then it's all systems go as he launches himself down the jump.

When he reaches take-off point the picture changes to give a side-on view of the competitor as he flies through the air.



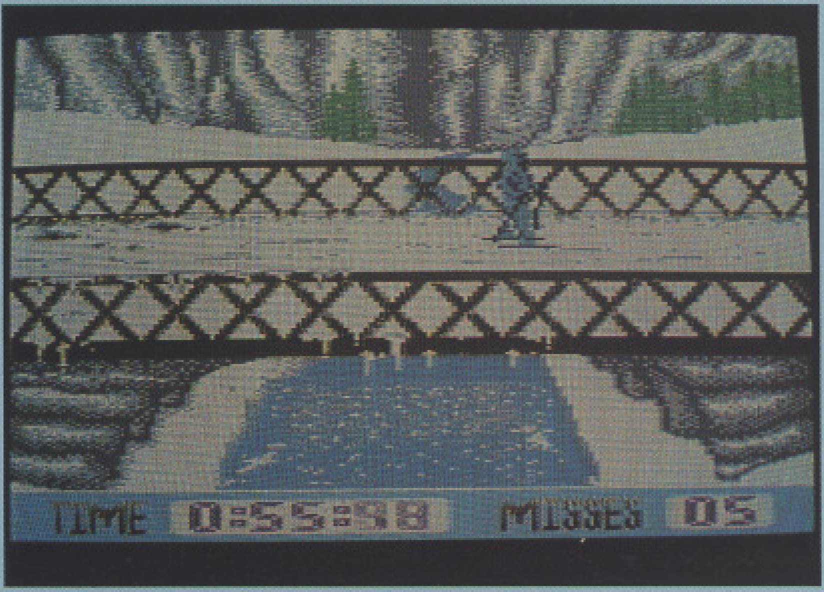
The Skijump

Unless you manipulate your joystick correctly, chances are the poor chap's legs and skis will go every which way and he'll make an ungainly landing, usually face first.

Unlike Eddie, the jumper doesn't get up and smile when he goes base over apex but instead beats the ground with his fists.

My skier must have had hands like raw beetroot by the time I'd finished because this is not one of the easier events to complete successfully, even though you do get three attempts at it.

The biathlon is somewhat boring and easy in comparison. It involves making two laps of a course on skis, the course consisting of a couple of flat tracts – one past a lake complete with motorboat – a short uphill climb, followed by a pretty bridge and then a short downhill run.



The Biathlon

The view during this is from the side. However, during each lap you have two opportunities to draw a bead with your rifle and hit five static targets – 20 targets and 20 bullets in all. Here the view is from behind the competitor.

The slalom is particularly difficult. Your view is from the side but moving downhill from right to left. You are supposed to weave past the appropriate poles but I found it only too simple to crash into the side barriers.



The Bobsleigh

Finally comes the two man bobsled event. The sled is first pushed from left to right to the top of the run when the picture changes to give you a view looking down the run.

This is rather like Pole Position on ice with the run scrolling towards you and the backdrop scenery whistling across from side to side as you go round bends.

A small display to the left of the main scene shows an overhead view of the course.

The sled has a natural tendency to swerve up the banks as it hurtles round bends and it is your job to see that it doesn't overturn. The ride seemed to go on forever but this event turned out to be the easiest in my experience.

The game's main strength lies in the very picturesque graphics – lots of lovely Alpine scenery here for you to enjoy, and some good animation, too. Sound effects and music are also used to the benefit of the game's atmosphere.

While the gameplay may not boast of anything new or novel, and perhaps lacks lasting interest, there's no doubt that Tynesoft has done a good job on this one and you certainly get your money's worth of thrills and spills.

Bob Chappell

Sound	8
Graphics	9
Playability	8
Value for money	8
Overall	8

Two player destruction

Product: Zybex
Price: £2.99
Supplier: Zeppelin Games, 28 Osborne Road, Newcastle upon Tyne NE2 2AJ.
Tel: 091-281 4401

AFTER taking a look at the pre-release version of Zybex in the March 1988 issue of *Atari User* I was delighted when the finished version arrived. Believe me, it was well worth the wait.

The game revolves around the fate of two rebels, Rinser and Cassalana. You control them in their bid to escape death row and execution – and before you think or say anything, not the one in Alcatraz.

To do this you have to undertake an almost suicidal mission to the Czoken System.

Once there you have to visit 16 strange worlds and do battle with wave after wave of alien hordes.

If you survive you will be awarded a teleport crystal which allows you access to other planets in the system.

Eventually you will reach the restricted levels and the ultimate challenge – the Zybex itself.

As well as needing the crystals for access to the other planets you are also governed by how many tokens you have collected.

After completing the initial level it is possible to advance up to level 12 in any order you want without a token, but after that you will need three tokens to get to the restricted areas. These are awarded after the completion of a level.

If you survive and retrieve the Zybex, the death rings – placed around your necks by your captors – will be removed.

To help you on the mission you have been given the Orbit weapon with its lowest power level.

As the mission progresses you can increase the destructive force of the Orbit by picking up debris of the same shape that appears on screen after you have blasted an alien wave.

Many different instruments of destruction can be collected including the Rail Gun, the 8-Way, the Wall and the Pulse.

Extra lives are awarded in the same way – simply fly over the spare man when he appears.

The game has an original shooting system. You have built-in auto-fire which allows you to select any of the weapons you have collected by pressing fire to step through them.

In later stages you can have them all going at once – it was a real pleasure watching aliens explode all over the screen under a hail of laser fire.

Your weapons are displayed in two status screens that sandwich the main playfield – one for each player.

Another status line near the bottom of the screen shows lives remaining, score and which weapon you are using.

You can have both players on screen at the same time, and luckily you can't shoot each other.



You will need your array of weapons

The play area uses a number of graphics modes with a carefully thought out use of colour and superb scrolling. The alien landscapes for the different planets have been beautifully designed.

Similar games are often criticised about the design and animation of the hero and aliens, but Zybex doesn't suffer from any of these faults.

The animation and design of your player is excellent. His arm jerks back as he fires his weapons and he swings and tucks his legs as he thrusts upwards or accelerates.

Every alien wave that attacks you is animated in its own way: Some rotate and others pulse as they zoom across the screen.

The game caters for everything you would ever want. The high score table has a dual entry mode – two players with two joysticks can enter their names at the same time.

All game options are controlled using the joystick – all you need to do is simply highlight the icon you want on the main title screen and away you go.

One of my favourite features is the music. Several pieces are used throughout, but the main tune is so catchy I found myself whistling it all day.

A fine finishing touch to a wonderful shoot-'em-up.

Neil Fawcett



The Czoken System – one of 16 worlds

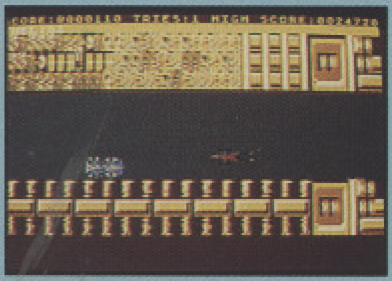
Sound	***10***
Graphics	***10***
Playability	***10***
Value for money	***10***
Overall	***10***

Double trouble...

Program: Double Packs I and II
Price: £7.99 (cassette), £9.99 (disc)
Supplier: Red Rat Software, 11-15 Fennel Street, Manchester M4 3DU.
Tel: 061-834 4941

DOUBLE Pack I contains two games, Mad Jax and Planet Attack. In the first you control a car driving through horizontally scrolling scenery and your objective is to travel as far as possible.

Out to stop you are a number of unsociable road hogs, which can either be shot or avoided.



Madjax – mad joyriding

Various items along the roadway can be picked up by driving over them. These include fuel, weapons and a couple of objects which appeared to have no discernible effect on anything.

One of the weapons on offer is a rearward shooting cannon. Although I scored what appeared to be direct hits on vehicles behind me many times, not one of them blew up. Most upsetting.

There are two sections of road, desert and city. In the former there are the road hogs, while in the latter there are additional hazards in the form of moving road barriers.

To survive the city section you must have collected enough fuel during your drive through the desert.

I found the graphics all right but movement was perhaps a little on the slow side. The gameplay isn't varied or interesting enough to hold the imagination for long.

The two sections – although getting progressively more difficult – are rather short and, as far as I could see, repeated ad infinitum.

Planet Attack is the better game of the two. Earth is under attack from Tritanian forces which have established a base on Mars and are being kept in our time zone by the installation of Time Scalers.

It's your job to destroy these by attacking them from the ship Star Eagle, but you seem to have about as much chance of succeeding as Stockport County has winning the FA Cup.

Graphics are an improvement on Mad Jax. The background scrolls by on six different levels and gives a passable illusion of dimension in depth.

Forward progress of your ship is at a pre-set pace and movements available are up, down and sideways. Your relative position is indicated by your shadow on the ground.



Planet Attack – rid Mars of the Tritans

Armaments available are forward shooting lasers to defend against attacking Tritanian Auto Droids, Space Cruisers and missiles.

The Star Eagle also has bombs which you can use to destroy ground installations, Tritanian settlements, radar sites and the all important Time Scalers.

Bombing a fuel dump increases your own fuel level, but if you do run out you can eject to safety. The game then continues as before, with you now controlling your ejector seat.

This amazing device also appears to be equipped with laser cannon and bombs and needs refuelling in the same way as your spaceship did.

After a short run – around 35 seconds – the landscape scrolls back to the launch pad and you must land your craft to gain bonus points. Re-launch for more of the same, but with additional hazards to contend with.



Double Pack II includes the games Space Wars and Dreadnought.

Space Wars really is looking a little long in the tooth. You control a spaceship at the bottom of the screen and have to fight off successive waves of aliens or meteors.

If you collide with one your shield loses effectiveness and the latter cannot be shot, but must be dodged.

This concept can still work if there is something in it to take it out of the ordinary and bring it alive. I didn't think Space Wars made that jump. The graphics are at

best only average, response is a little sluggish and detection of a missile hit on the aliens seemed suspect at times.

The game's simplicity may appeal to younger children, perhaps just starting out on careers in Universe-saving, but more experienced players will probably lose interest after a short while.

The other game Dreadnought, is a sort of sub-aquatic Dropzone. You control a submarine, blasting enemy subs and negotiating traps and underwater hazards.

You can move deeper into the water or towards the surface. Hitting the sea bed, or indeed surface waves, costs you a life.

Horizontal speed can be delicately controlled and I found that I was more successful when resisting the urge to belt round at a rate of knots blasting everything.

A slower pace made for more controlled accuracy and more reaction time if the enemy ships suddenly turned in front of you – as they had a habit of doing in the later stages.

Although not possessing the finesse, frenetic action or same quality graphics of Dropzone, Dreadnought is not a bad budget game in its own right.

Niels Reynolds

Pack I	
Sound	*6*
Graphics	*7*
Playability	*7*
Value for money	*7*
Overall	*7*

Pack II	
Sound	*6*
Graphics	*7*
Playability	*7*
Value for money	*6*
Overall	*7*

Kicking into touch...

Program: Super Soccer
Price: £9.95 (cassette), £14.95 (disc)
Supplier: Tynesoft, Unit 3, Addison Industrial Estate, Blaydon, Tyne and Wear NE21 4TE.
Tel: 091-414 4611

WHEN all matches are off due to adverse weather conditions and Subbuteo sets have long since been strewn to all four corners of the loft, soccer fans might well be tempted to try a football game on their Atari.

Super Soccer gives you the opportunity to play a match against a team controlled by your computer or by another player.

Team colours can be cycled, although both teams end up looking much the same and even the goalkeepers wear the same colours as their team.

You can choose which country you want to represent, but this seems to have no bearing on the game and is not referenced elsewhere – for example, the scoreboard merely titles the sides as home and away.

Your view of the action is from the side with the pitch set against a backdrop of static spectators and ground-level advertisements.

The two teams – quite large figures – troop out, a whistle sounds and play begins. As players advance towards either goal – only a part of the pitch is visible at any time – the screen scrolls rather jerkily.

The player currently under control from each team is highlighted by a pair of brackets surrounding his head. Players and ball move slowly, particularly when two players are close to each other – essential when one player is trying to gain possession of the ball.

It is sometimes difficult to see who is who and quite what is going on.

The goalies can be controlled to a limited extent but only when the ball is nearby. At the press of the fire button, the appropriate one will immediately execute an unballetic dive.

The goalkeepers are likely to find themselves on the free transfer list before long – on several occasions they faced their goal when a goal kick was being taken.

I don't know if the invisible referee was off buying a packet of peanuts whenever it happened, but the teams have an unlawful habit of taking a goal kick when opponents are still in the goal area.

There is a good sporty opening tune, but apart from that and the piercing whistle, sound effects are lacking.

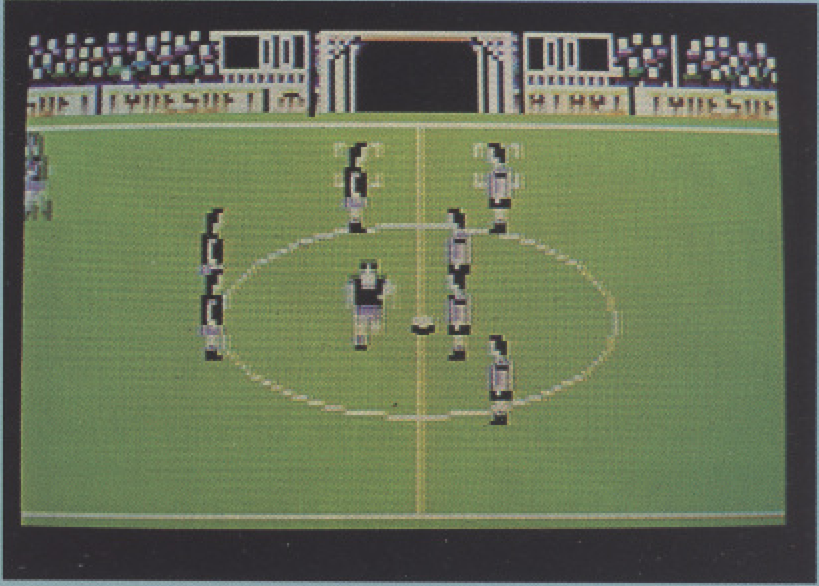
The roar of the crowd is nothing more than a constant hiss which rises and falls in volume in relation to the action and the ball boinks unrealistically when it bounces.

No, much as I love football, I really couldn't take to this game. It plays a little too slowly for my liking and didn't generate enough feeling of a real match. If it's a football simulation you want – I use this word because a graphical representation is not the same – you would be better off getting Addictive Games' ancient Football Manager – it's still the best soccer simulation.

But if you actually want to see 22 men running around a pitch you might give this one a try.

Bob Chappell

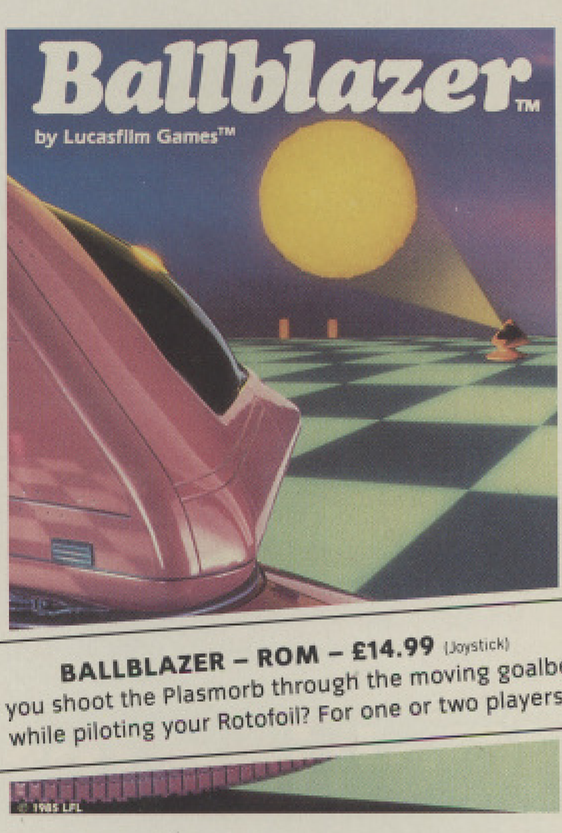
Sound	*5*
Graphics	*6*
Playability	*5*
Value for money	*5*
Overall	*5*



THE LATEST AND



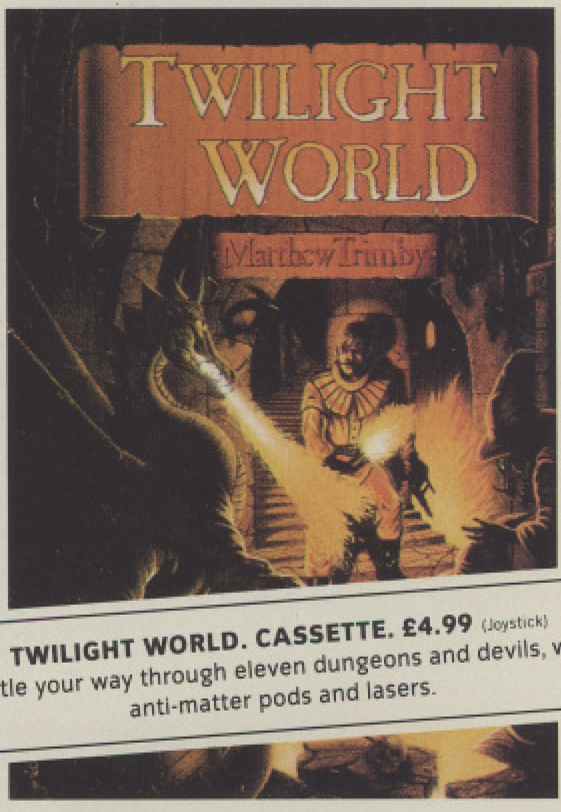
ARCHON – ROM – £14.99 (Joystick)
A battle between the forces of light and darkness. You can't take a square, you have to fight for it.



BALLBLAZER – ROM – £14.99 (Joystick)
Can you shoot the Plasmorb through the moving goalbeams while piloting your Rotofoil? For one or two players.



RESCUE ON FRACTALUS – ROM – £14.99 (Joystick/keyboard optional)
You have to rescue your friends from Fractalus – but the evil Jaggi aren't going to make it easy.



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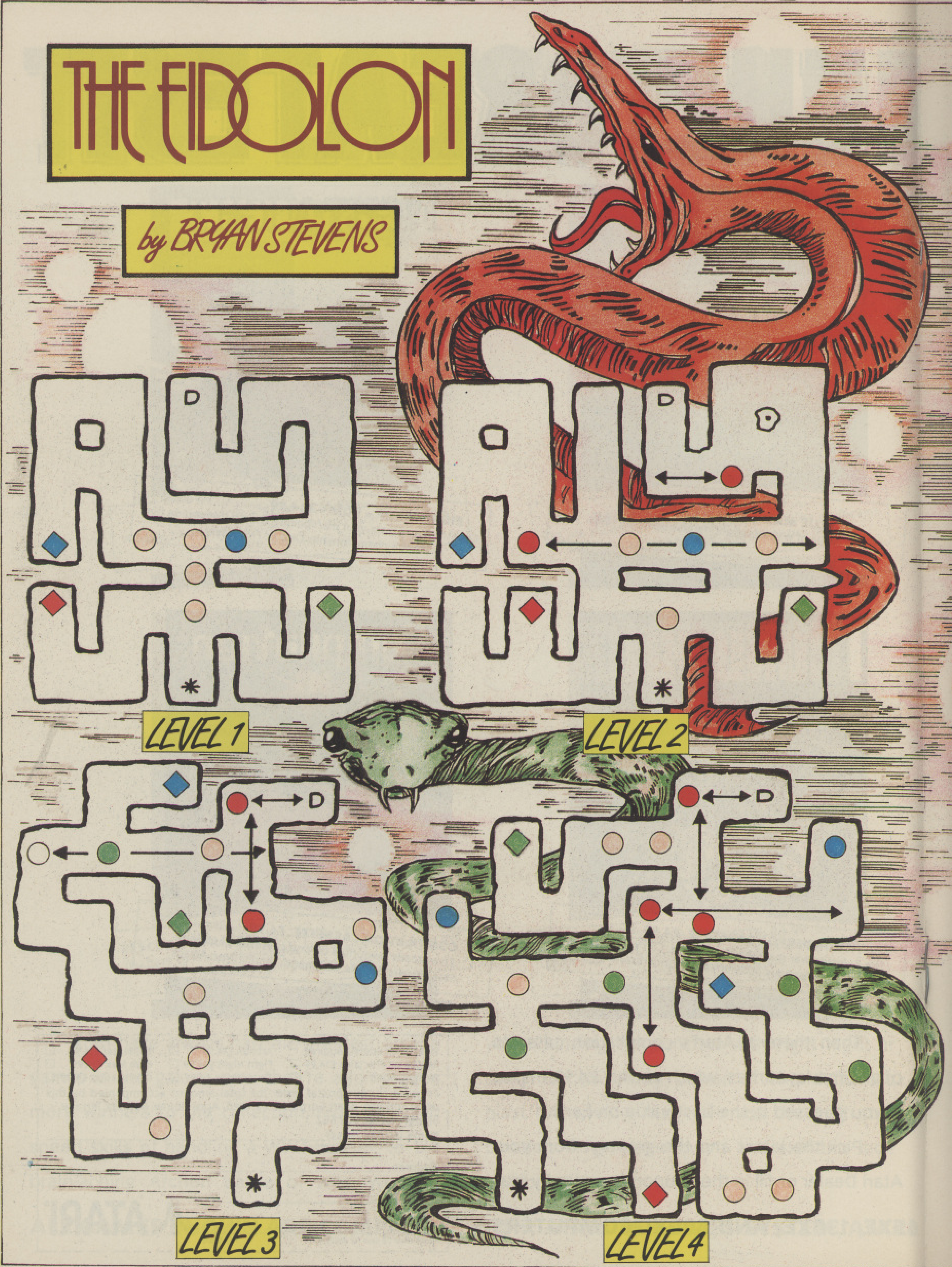
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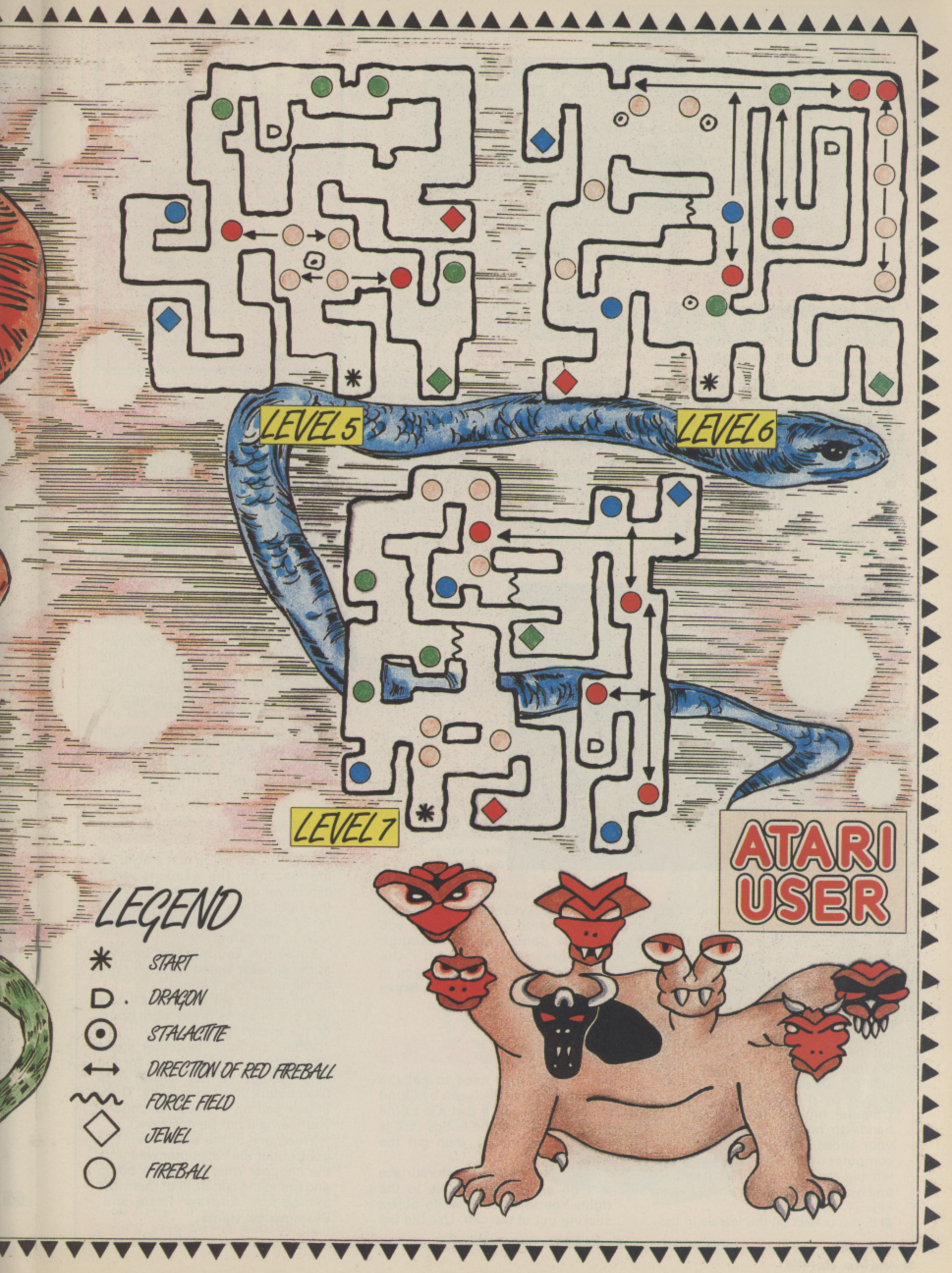
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ATARI®

THE EIDOLON

by BRYAN STEVENS





LEVEL 5
LEVEL 6
LEVEL 7
ATARI USER
LEGEND
START
DRAGON
STALACTITE
DIRECTION OF RED FIREBALL
FORCE FIELD
JEWEL
FIREBALL

Your HINTS & TIPS

WE welcome letters from readers giving their help with games on the Atari that they would like to pass on to other readers. The address to write to is:

Hints and Tips
Atari User
Europa House
Adlington Park
Adlington
Macclesfield SK10 4NP

The Eidolon

THIS month's map on page 32 shows you the levels of Activision's entertaining game The Eidolon, so to complement it here are some useful tips:

● On the lower levels the Jewel Guardians are not very dangerous, but they can still drain your energy. So when you approach one, to wake it up, shoot your fireballs at it quickly while moving backwards.

● If you do manage to get lost, press P to pause the game and then refer to the map.

● Shooting a blue fireball at a creature will freeze it, but a green one will change it into something else. But beware, the monster it changes into may be more dangerous than the one you faced in the first place.

● When you're fighting something dangerous and your energy level gets too low don't be proud – just run away. Amass more energy by collecting fireballs and return for another go.

● When confronting a dragon, you can still collect the fireballs it spits at you by pressing the spacebar. Unusual hint: If you need both hands to hold your joystick, take your shoes and socks off, put the computer on the floor and use your left big toe to press the spacebar and your right one to press the P key.

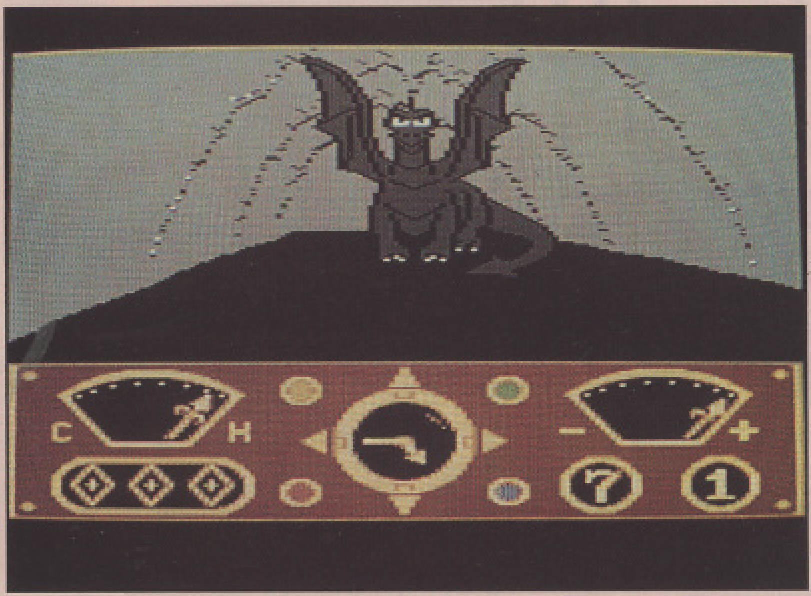
● If you collect all the jewels in the first five levels you can bypass all the creatures in levels six and seven. That is if you don't get killed by a dragon, in which case you lose all the jewels.

● If you run out of time you will have to start again on level one. So if time is running out you have two options: Face any wall and shoot at it – the fireballs will rebound and kill you – or let a creature or dragon kill you.

● On level eight, collect as many jewels as you can to give you a high energy level. Avoid all the red fireballs – you can't shoot them, as the roof is too low.

● Finally, when you meet the dragon on level eight, don't panic.

Next month we'll introduce you to the demonic and strange monsters that inhabit the underground caves and tell you in detail how to kill them. – **Bryan Stevens, Andover, Hants.**



One of the dragons you encounter in the game

Universal Hero

FIRST of all you need to get the remote switch, which can be found in what looks like a cart. Go to the force field where the floppy disc is and use the switch, then get the disc.

Next, get to the tap on the surface and go as far as possible to the right. You will see a white object sticking out of the cliff. Use the tap to stop the fountain. Now go all the way down the cliff and get the wire. Go to the dynamite, near the start and down to the right.

Get the plunger and go to the room with all the rocks piled up. Use the plunger to clear the door.

Go through this door and use the plug and the floppy disc. When asked to identify yourself type SLARTIBARTFARST and the force door will now open. Go through it to the pineapple.

Get the oil and go to the fountain room. Two screens on from this you will find a red machine. Get the fuel and go to the spaceship, but make sure that you have the ID card.

Use the fuel and the ship will launch while you get ready for the next puzzle. – **Gary Quigley, Finglas, Dublin.**

Spy Hunter

WHEN the spy car is first placed on the road from the weapons van it can travel on the rough ground to the right of the screen – this normally causes your car to explode later in the game.

To do this you must go forward at the slowest speed and pull right as far as the car will go.

The noise is pretty bad but it gets you out of some pretty tight spots on the expert level.

When the mad helicopter starts attacking the spy car, watch for the small square on the side of it to flash before you move away. Then, unless you hit a screen boundary, your car will not be destroyed.

When one of the enemy vehicles goes under the helicopter wait until the chopper tries to drop a bomb and fire at the car. Both of them will explode. – **Andrew Patterson, Basingstoke, Hants.**

Back to the Golden Age of Adventures

by Rouloc

WITH few new adventures being released for the 8 bit Atari just now, I suggest you rummage around in your sack and pull out a few of those golden oldies and revisit old acquaintances.

And what better way to start with than with an Infocom adventure – there is so much in them that they always repay a return visit. The classic Zork trilogy should be high up on your list, as should Planetfall, Deadline and Wishbringer.

For cassette owners, I would recommend Level 9's Colossal Adventure for a replay. This is the best version of the famous Crowther and Woods original Colossal Cave adventure that I know, and still gives me a real kick every time I go back to it.

One new adventure for 48k Atari machines has come to my attention, but due to the fact that my disc drive has been showing signs of old age, I have been unable to give it the Rouloc razor-sharp review treatment. The game is OCI – Operation Computer Industry – and is produced by a company called Tearsoft.

The plot concerns one Professor Decker who has kidnapped a bunch of programmers attending a software conference. His plan is to hold them hostage while you go off and recover a folder which will prove that the professor's son was killed in a fighter test crash in 1980.

To keep the authorities at bay and the town clear while you accomplish your task, the professor has built an atomic bomb and has other aggressive tricks up his sleeve – no half-measures for this guy!

OCI is a text only adventure using a simple vocabulary. It costs only £1.99 on cassette and £2.99 on disc, so you can't really go wrong. Copies are available direct from Tearsoft at Seawinds, Croft Road, Lochcarron, Ross-Shire IV54 8YA.

Lots of help has been supplied by readers in response to Dave Hall of Sheffield's pleas for assistance with Alternate Reality: The Dungeon. Although Dave has since written to say that he is well on the way to solving all the secrets of this adventure, I think it would help other readers to print some of the advice received from those adventurers who have taken the time and trouble to write in.

David Lago of Burton-Upon-Humber says that he has found it better to start off with a new character, as imported ones seem to get killed off too easily. He brought in a really good Level 11 character from the city but that too suffered the same early demise.

The progression of statistics is much better if you start off from scratch, says David, and by using good weapons found in special places, you can have a better character at Level 5 in the Dungeon than by importing a higher level one from the City.

David recommends that if you find a silver key on a corpse or elsewhere, you should take it to the prison in the palace dungeon area. There you can free Acrissimird's assistant who will give you a spell called Temporal Fugue which speeds you up in combat, makes you hit harder and lets you pick up dropped weapons.

The oracle doesn't appear to know what your abilities are, but simply lists the quests in order. There's nothing for it but to keep on throwing in gold and listening. The first clue to the Gargoyle's riddle is SHIPWRECK and you can only cross the River Storm at midnight.

Susan Fairhurst of Ashton, near Wigan, adds to this by saying that the other words needed to answer the Gargoyle's riddles are ORACLE and BLOODSTONE. She warns to take care as there is something nasty on the other side of the river.

Susan and others also advise that you check that you have version 2.1, as version 2.0 has two FBI agents that prevent you from transferring a city character to the dungeon.

Susan would like to know the solution to the three doors. She knows that going to the first three times opens the one to the corridor and going to door two shuts it – but what does door three do? The answer is something to do with two other minor quests – but does anyone know what?

Poet Laureate of the month award has to go to Dave Fox of Kemsing in Kent. He has sent in a number of

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◀ *From Page 35*

rhyming tips for The Dungeon. For example:

A beast with fangs and fearsome gaze,
Whose hide will stop the keenest blades;
All forms of magic it withstands,
Yet thou might conquer with bare hands.

Good, eh? What it actually means is that to gain the Bloodstone you must kill the Basilisk using the mirrored shield and your bare hands.

In return for his magnificent poetic efforts, the bard Dave Fox would like to know what is the Axiom of Truth in Ultima IV. Can anyone help? And, in addition, Dave Hall of Sheffield still has one question unanswered – what is the name of the Gargoyle?

Finally, in response to requests from other readers including Chris Leighton of Sherwood in Nottingham and Andrew Merrett of Worthing, Sussex, I have given some hints for Guild of Thieves and The Price of Magik.

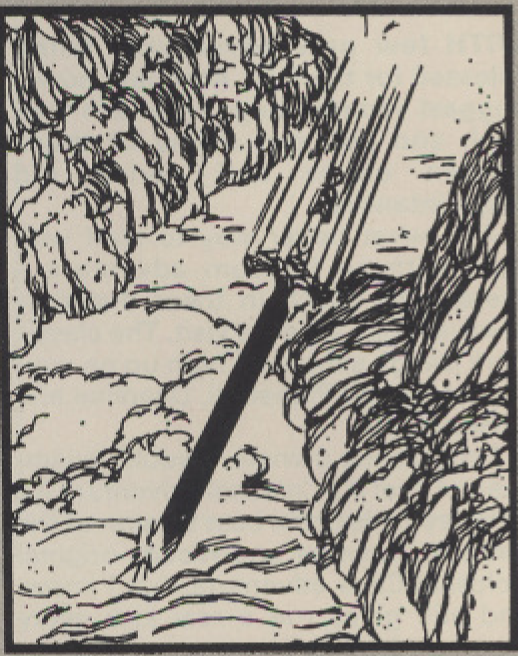
Until next month, exciting adventuring!

GUILD OF THIEVES

To cross the room of coloured squares starting on the black square, follow the colours of the rainbow backwards – violet, indigo, blue, green, yellow, orange and red – then move to the white square. You should have noticed that WOBNIAR is the word Rainbow spelled backwards! To return across the room, reverse the order.

To enter the Bank of Kerovnia, you must place all the treasures in one of the night safes – the sign outside the bank will change, depending on how many treasures have so far been deposited.

The pick is used to get the chips of mineral from the rock face near the waterfall.



PRICE OF MAGIK

To recover the sword stuck through the ceiling, push the secret panel in one of the rooms – S then SE from the Misty Corridor – in the oak panelled corridor then pull the lever. To read the inscription on the ceiling, cast the fly spell on yourself.

To deal with the glowing gateway, try giving any spell focus – the pendulum, for example.

OVER £600 IN PRIZES

NOW WE ARE THREE

This month Atari User is three years old and much has happened in the last 12 months. The quality of software continues to improve as games players expect more and more from their computers. Indeed Atari itself has launched an addition to its range with the Atari XE Games System.

So to celebrate the success of the Atari as a games machine we are offering you the opportunity of winning:

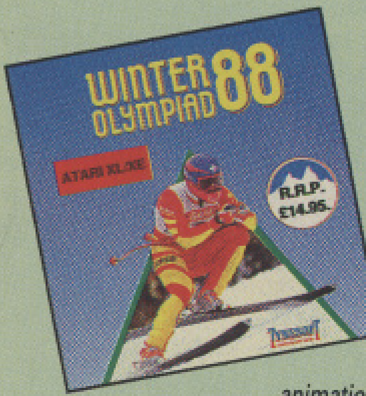


1st PRIZE

The Atari XE Games System consisting of keyboard, 65XE console, light gun, joystick and built-in Missile Command. You will also receive copies of the classic Flight Simulator II and Bug Hunt, which shows the potential of the light gun. ***Value: £119.99***

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André Willey, Atari User, February 1988



2nd PRIZE

From Tynesoft comes Winter Olympiad 88. This exciting new release comprises five games with first-rate graphics and excellent gameplay. There are 15 copies to be won. ***Value: £14.95 each***

"Lots of lovely Alpine scenery for you to enjoy, and some good animation too. Sound effects and music are also used to the benefit of the game's atmosphere."

Bob Chappell, Atari User, May 1988



3rd PRIZE

15 copies of Mirax Force and Phantom – two more games of quality from Tynesoft.
Value: £9.95 each

Mirax Force: *"The sound, graphics and superb scrolling complement each other ... with numerous levels featuring the very best of the Atari's graphic capabilities."*

Neil Fawcett, Atari User, January 1988

Phantom: *"Character animation is superb both for spooks and your player character. Phantom is original and well worth buying for the sheer pleasure of playing it."*

Neil Fawcett, Atari User, July 1987

WHAT YOU HAVE TO DO

Simply answer the following four questions, complete the entry form and send it to arrive no later than May 29, 1988.

QUESTIONS

1. Which event did Eddie Edwards enter in the 1988 Winter Olympics?
2. In which year did Torvill and Dean win their last Gold Olympic medal?
3. How many GhostBusters were there by the end of the film?
4. Which film is famous for the phrase: "May the Force be with you"?

ENTRY FORM

ANSWERS:

1.____________________

2.____________________

3.____________________

4.____________________

Name:____________________

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____

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I would like to receive *disc/cassette versions of my prize.
(* Please delete the format you do not require)

Return to: **Third Birthday Competition, Atari User, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.**

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GIR! Calculates and presents the useful *Atari User* checksums instantly.

REN Instantly renumbers your Basic programs in any line increment.

DIR Displays a directory of any drive without having to enter Dos.

VAL Converts numbers between decimal, hexadecimal and binary.

LVAR Gives the name of all used variables and a list of all their occurrences.

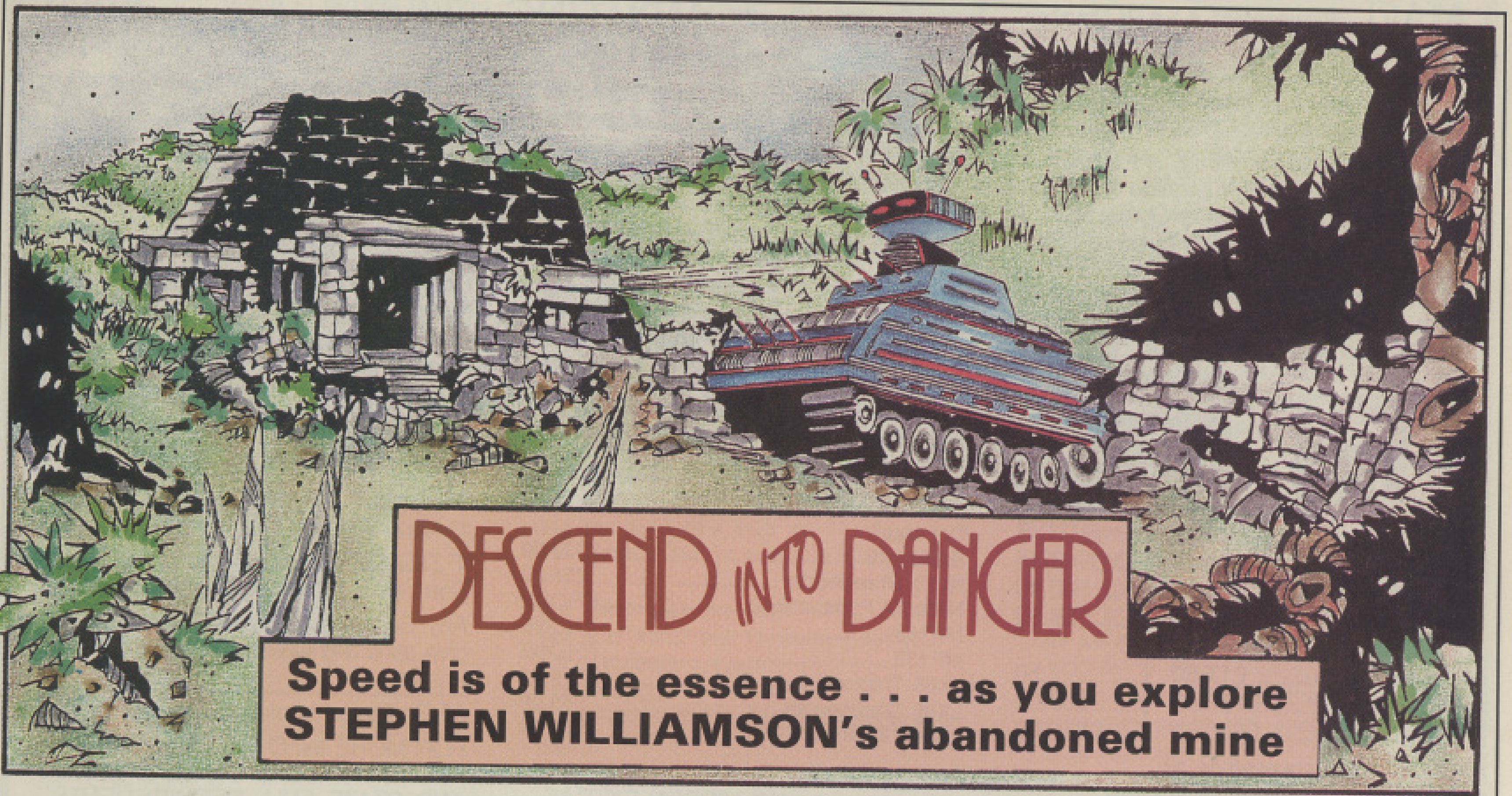
CHANGE Alters the name of a variable at every occurrence in a program

STRIP Removes all REMs and reduces the size of the program.

LISTING Prints and includes the Atari special characters on an Epson printer.

£5.95 tape
£7.95 disc

TO ORDER PLEASE USE THE FORM ON PAGE 61



DESCEND INTO DANGER

Speed is of the essence . . . as you explore STEPHEN WILLIAMSON's abandoned mine

HERE'S a very addictive game set in an abandoned mine which you explore in your UEV – Underground Exploration Vehicle. You descend from the top of each level – nine in all – avoiding radioactive stalactites, stalagmites, and evil ghosts on the prowl for victims.

A joystick plugged into port one controls the UEV's movements and the fire button accelerates it in case of trouble. You start the game with nine lives – and you'll need them – with extra ones being given as you enter levels four, six and eight. Touching walls, ghosts or various obstacles robs you of one life.

Once you've completed a level you are awarded a bonus which is calculated according to the time it took you – the quicker you do it the more you score.

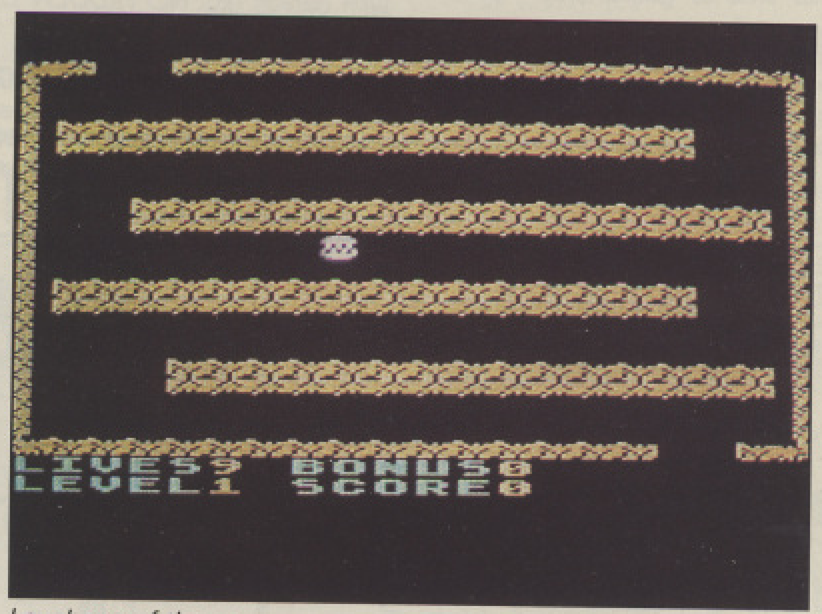
Each successive level gets harder and some require a lot of thought before you can complete them. After you have finished press Start to begin again.

The layout for levels one to four can be found between lines 900 and 1090, with levels five to seven between 1550 and 1740. These routines use re-defined characters which makes it very easy to customise your own version of the game.

If you delete line 480 you can have infinite lives, while changing line 420 to read:

```
420 RETURN
```

will remove all collision detection for your UEV and allow you to travel through walls and see the whole game from start to finish.



Level one of the game

```
10 REM MINE RUNNER
20 REM BY STEPHEN WILLIAMSON
30 REM (c)ATARI USER
40 REM INITIALISE
50 DIM SPC$(20):SPC$="
   ":REM 19SPACES
60 GRAPHICS 17:SETCOLOR 2,0,0
70 POSITION 0,20:? #6;"mine runner"
80 ? #6;"by steve williamson"
90 ? #6;"initialising....."
100 GOSUB 1960:GOSUB 2040
110 LEVEL=1:POKE 752,1:LIVES=9:POKE 70
4,78
120 SM=PEEK(88)+256*PEEK(89):GOSUB 112
0
130 REM LOAD MC ROUTINE
140 RESTORE 1770:FOR I=0 TO 283:READ A
:POKE 30000+I,A:NEXT I
150 REM SET UP PM SYSTEM
160 PMB=36864:PL=PMB+1024:PL1=PMB+1280
:PL2=PMB+1536
170 RESTORE 1930:FOR I=0 TO 31:READ A:
POKE PMB+I,A:NEXT I
180 FOR I=0 TO 255:POKE PL+I,0:POKE PL
1+I,0:POKE PL2+I,0:NEXT I
190 POKE 53277,3:POKE 54279,144:POKE 5
59,62:POKE 623,1
200 RESTORE 220:FOR I=0 TO 14:READ A:P
OKE PL1+I+167,A:NEXT I
210 POKE 705,140:HPOS1=53249:POKE HPOS
1,100
220 DATA 56,124,254,214,146,186,238,23
8,238,254,124,68,68,56,56
230 M=USR(1556):REM INITIATE VBI ROUTI
NE
240 COLLF=53252:COLLP=53260:GOSUB 620
250 SPEED=1536:HP=1537:VP=1538:DIR=154
0:POKE 1541,0
```

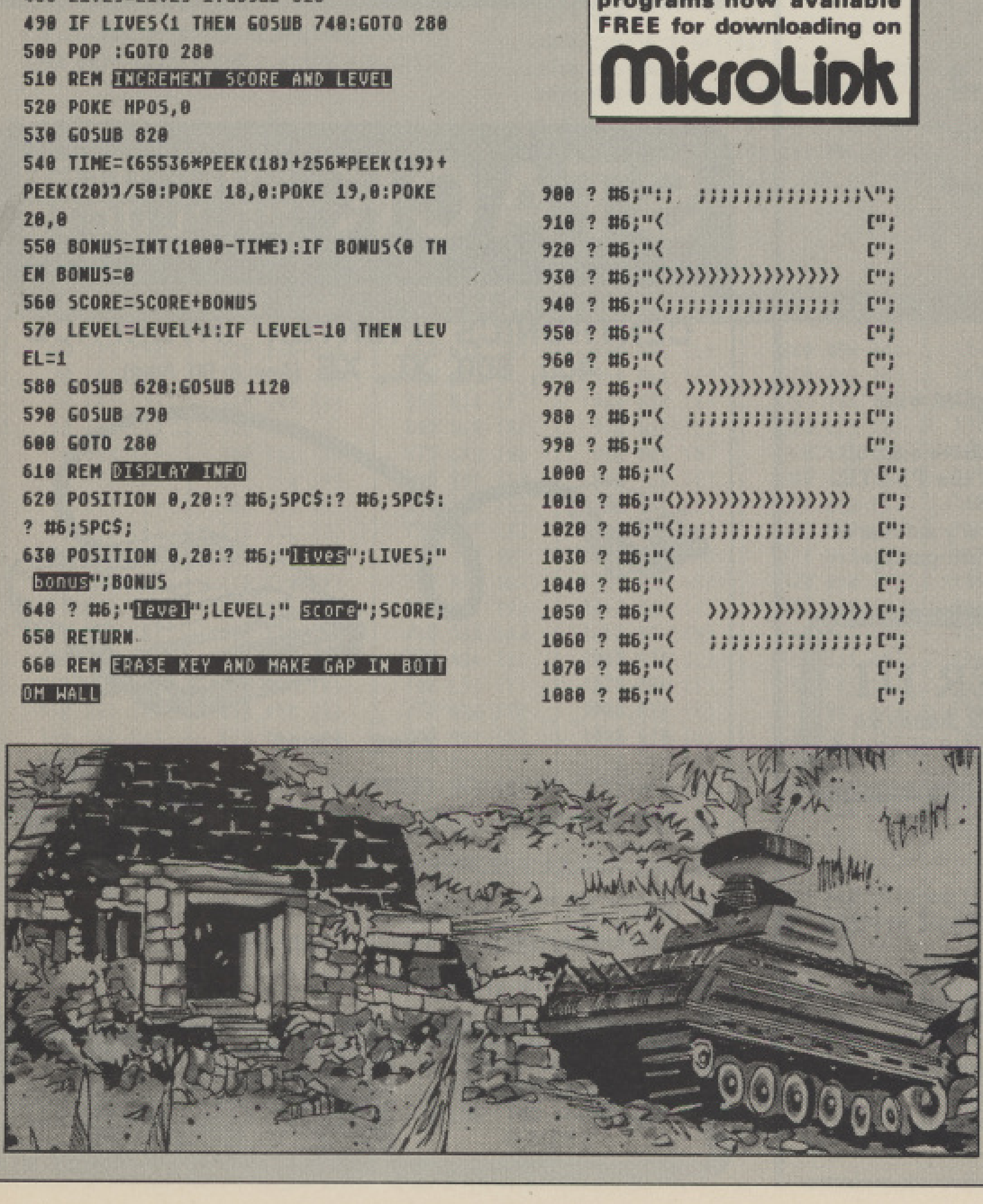
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```
260 POKE 1541,0:SCORE=0:BONUS=0
270 REM INITIALISE HOVERCRAFT
280 POKE SPEED,199:POKE HP,70:POKE VP,
25:POKE DIR,1
290 REM
300 POKE 53278,0:A=USR(30213)
310 POKE 18,0:POKE 19,0:POKE 20,0:REM
SET TIMERS TO ZERO
320 REM MAIN CONTROL LOOP
330 A=USR(30000)
340 IF PEEK(VP)<25 THEN POKE VP,25
350 IF PEEK(VP)>192 THEN 520
360 IF PEEK(COLLF)=0 AND PEEK(COLLP)=0
 THEN GOTO 330
370 IF PEEK(COLLP)<>0 THEN GOSUB 420
380 IF PEEK(COLLF)=8 THEN GOSUB 670
390 IF PEEK(COLLF)<>8 THEN GOSUB 420
400 POKE 53278,0:GOTO 330
410 REM HIT WALL OR CEILING
420 IF PEEK(VP)>178 THEN POKE 53278,0:
GOTO 330
430 POKE HPOS,0
440 FOR N=10 TO 120:SOUND 0,N,8,14:NEX
T N
450 SOUND 0,0,0,0
460 FOR I=0 TO 28:POKE PL+PEEK(VP)+I,0
:NEXT I
470 POKE 53278,0
480 LIVES=LIVES-1:GOSUB 620
490 IF LIVES<1 THEN GOSUB 740:GOTO 280
500 POP :GOTO 280
510 REM INCREMENT SCORE AND LEVEL
520 POKE HPOS,0
530 GOSUB 820
540 TIME=(65536*PEEK(18)+256*PEEK(19)+
PEEK(20))/50:POKE 18,0:POKE 19,0:POKE
20,0
550 BONUS=INT(1000-TIME):IF BONUS<0 TH
EN BONUS=0
560 SCORE=SCORE+BONUS
570 LEVEL=LEVEL+1:IF LEVEL=10 THEN LEV
EL=1
580 GOSUB 620:GOSUB 1120
590 GOSUB 790
600 GOTO 280
610 REM DISPLAY INFO
620 POSITION 0,20:? #6;SPC$:? #6;SPC$:
? #6;SPC$;
630 POSITION 0,20:? #6;"lives";LIVES;"
bonus";BONUS
640 ? #6;"level";LEVEL;" score";SCORE;
650 RETURN
660 REM ERASE KEY AND MAKE GAP IN BOTT
OM WALL
670 POKE SM+201,0:POKE SM+396,0
680 FOR N=64 TO 0 STEP -1
690 SOUND 0,N,10,12
700 NEXT N
710 IF LEVEL>7 THEN POKE SM+210,0
720 RETURN
730 REM GAME OVER
740 POSITION 0,22:? #6;"GAME OVER"
750 SCORE=0:BONUS=0:LEVEL=1:LIVES=9
760 IF PEEK(53279)=7 THEN 760
770 GOSUB 1120:GOSUB 620:RETURN
780 REM ERASE HOVERCARFT SHAPE
790 FOR I=0 TO 28:POKE PL+PEEK(VP)+I,0
:NEXT I
800 RETURN
810 REM FINISH LEVEL SOUND EFFECT
820 REM
830 FOR N=14 TO 6 STEP -2
840 SOUND 0,N*6,14,14:SOUND 1,N*8,14,1
2
850 FOR D=1 TO 100:NEXT D
860 NEXT N:FOR D=1 TO 50:NEXT D:SOUND
0,0,0,0:SOUND 1,0,0,0
870 RETURN
880 REM BASIC SCREEN DISPLAY - LIVES 1
 TO 4
890 POSITION 0,0
```



```
900 ? #6;":;  ;;;;;;;;;;;;;;;\";
910 ? #6;"<                  [";
920 ? #6;"<                  [";
930 ? #6;"<>>>>>>>>>>>>>>>>  [";
940 ? #6;"<;;;;;;;;;;;;;;;;  [";
950 ? #6;"<                  [";
960 ? #6;"<                  [";
970 ? #6;"<  >>>>>>>>>>>>>>>>[";
980 ? #6;"<  ;;;;;;;;;;;;;;;;[";
990 ? #6;"<                  [";
1000 ? #6;"<                  [";
1010 ? #6;"<>>>>>>>>>>>>>>>>  [";
1020 ? #6;"<;;;;;;;;;;;;;;;;  [";
1030 ? #6;"<                  [";
1040 ? #6;"<                  [";
1050 ? #6;"<   >>>>>>>>>>>>>>>[";
1060 ? #6;"<   ;;;;;;;;;;;;;;;[";
1070 ? #6;"<                  [";
1080 ? #6;"<                  [";
1090 ? #6;"=>>>>>>>>>>>>>>>>  >?";
1100 RETURN
1110 REM PLOT SCREEN DISPLAYS
1120 POKE 709,60:POKE 710,0:POKE 711,1
70:POKE 708,LEVEL*16+10
1125 IF LEVEL>4 THEN 1255
1130 IF LEVEL>7 THEN GOTO 1340
1140 IF LEVEL=1 THEN GOSUB 890:RETURN
1150 POKE SM+26,125:POKE SM+34,125
1160 POKE SM+49,126
1170 IF LEVEL=2 THEN RETURN
1180 POKE SM+183,125:POKE SM+192,125
1190 POKE SM+206,126:POKE SM+216,126
1200 IF LEVEL=3 THEN RETURN
1210 POKE SM+261,125:POKE SM+267,125:P
OKE SM+273,125
1220 POKE SM+284,126:POKE SM+298,126
1230 RESTORE 220:FOR I=0 TO 14:READ A:
POKE PL2+I+72,A:NEXT I
1240 POKE 706,12
1250 IF LEVEL=4 THEN LIVES=LIVES+1:GOS
UB 620:RETURN
1255 GOSUB 1540
1260 IF LEVEL=5 THEN RETURN
1270 POKE SM+183,125:POKE SM+187,125
1280 POKE SM+205,126
1290 IF LEVEL=6 THEN LIVES=LIVES+1:GOS
UB 620:RETURN
1300 POKE SM+293,126:POKE SM+115,126:P
OKE SM+32,125:POKE SM+250,126
1310 IF LEVEL=7 THEN RETURN
1320 REM
1330 REM LEVEL8
1340 FOR Y=21 TO 361 STEP 20
1350 FOR X=0 TO 17:POKE SM+Y+X,0:NEXT
X:NEXT Y
1360 IF LEVEL=9 THEN GOSUB 1480:POKE S
M+210,193:RETURN
1370 POKE SM+2,0:POKE SM+3,0
1380 FOR I=21 TO 342 STEP 80
1390 FOR L=0 TO 17 STEP 2
1400 POKE SM+I+L,125
1410 NEXT L:NEXT I
1420 FOR I=61 TO 302 STEP 80
1430 FOR L=1 TO 17 STEP 2
1440 POKE SM+I+L,125
1450 NEXT L:NEXT I
1460 POKE SM+210,193
1470 IF LEVEL=8 THEN LIVES=LIVES+1:GOS
UB 620:RETURN
1480 REM LEVEL9
1490 FOR I=0 TO 70:L=INT(RND(1)*360):I
F PEEK(L+SM)=0 THEN POKE L+SM,INT(RND(
1)*2)+125
1500 NEXT I:POKE SM+2,0:POKE SM+3,0
1510 RETURN
1520 REM PLOT BASIC SCREEN DISPLAY LEV
ELS 5 TO 7
1530 REM CONTROL CHARACTER ON LINE 260
5 IS REVERSE/CONTROLAA
1540 POSITION 0,0
1550 ? #6;":;  ;;;;;;;;;;;;;;;\";
1560 ? #6;"<>> >>>>>     >>>>[";
1570 ? #6;"<;; ;;;;       ;;;[";
1580 ? #6;"<>> >>>>   >>   >>[";
1590 ? #6;"<;   ;;   ;;;    ;[";
1600 ? #6;"<>        >>     >>[";
1610 ? #6;"<;       ;;    ;;;;[";
1620 ? #6;"<>>>>>>>>>     >>>>>[";
1630 ? #6;"<;;;;;;;;;  ;;;;;;;[";
```



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ATARI

ATTENTION
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TRANSDISK IV

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READ ON!

Are you tired of waiting for cassette games to load? Would you like to transfer them to disk for faster, more reliable and convenient loading? You may have heard or read that this is not possible. Well, not only is it possible, but there is a program, Transdisk IV, that will do it all automatically, you require no knowledge of cassette protection techniques! To put it simply, Transdisk IV will read ANY Atari cassette, (single, multi-stage, non-standard format, 64K – no problem!), remove the protection, then place it on to disk for you. Plus, to load and run the new disk version of a cassette program requires just one keypress from a convenient, autorun menu disk.

The cost of this, the most powerful tape to disk utility for the Atari is just, £24.95 inclusive of first class delivery. Also comes complete with comprehensive instructions which were specially written with the cassette upgrader and first time disk user in mind.

Requires: Atari 800XL or 130XE Computer with disk drive and cassette recorder.

Remember, that not only will you save money on upgrades to disk (if they are available) but many games are only available on cassette anyway so Transdisk IV has to be a worthwhile investment!

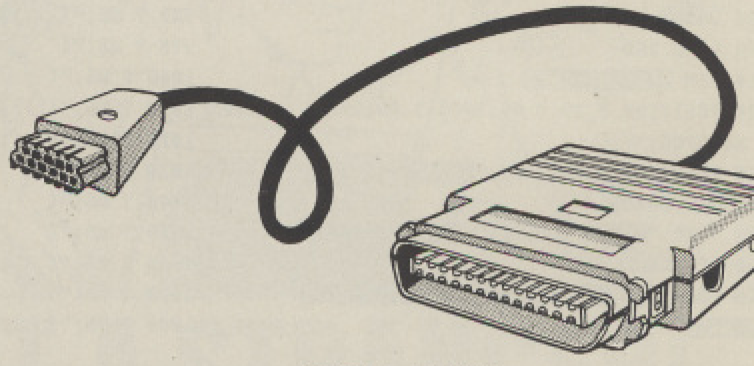
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```
1640 ? #6;"<             >>>>>>>>[";
1650 ? #6;"<[;            ;;;;;;;;[";
1660 ? #6;"<>>>>>>>>     >>>>>>[";
1670 ? #6;"<;;;;;;;;;     ;;;;;[";
1680 ? #6;"<>>>>>>>>>>>   >>>>[";
1690 ? #6;"<;;;;;;;;;;    ;;;;;[";
1700 ? #6;"<>>>>>>>>>>  >>>>>>[";
1710 ? #6;"<;;;;;;;;;;; ;;;;;;;[";
1720 ? #6;"<                   [";
1730 ? #6;"<                   [";
1740 ? #6;"=>>>>>>>>>>>>>>>>>>>>?";
1750 RETURN
1760 REM MACHINE CODE DATA
1770 DATA 104,169,0,141,30,208,173,120
,2,201,15,240,14,201,7,208,0,173,120,2
1780 DATA 201,15,240,3,141,4,6,173,132
,2,201,0,240,4,201,1,240,22,162,0
1790 DATA 206,0,6,173,0,6,201,2,208,5,
169,3,141,0,6,232,224,15,208,236
1800 DATA 162,0,238,0,6,173,0,6,201,20
0,208,5,169,199,141,0,6,173,4,6
1810 DATA 201,7,208,10,32,6,118,32,65,
118,238,1,6,96,201,11,208,10,32,6
1820 DATA 118,32,65,118,206,1,6,96,201
,14,208,10,32,6,118,32,65,118,206,2
1830 DATA 6,96,201,13,208,9,32,6,118,3
2,65,118,238,2,6,201,6,208,13,32
1840 DATA 6,118,32,65,118,206,2,6,238,
1,6,96,201,9,208,12,32,6,118,32
1850 DATA 65,118,238,2,6,206,1,6,201,1
0,208,12,32,6,118,32,65,118,206,1
1860 DATA 6,206,2,6,201,5,208,12,32,6,
118,32,65,118,238,1,6,238,2,6
1870 DATA 96,172,0,6,162,250,202,208,2
53,136,208,248,96,104,174,2,6,173,5,6
1880 DATA 201,0,240,9,169,0,141,5,6,16
8,76,32,118,169,1,141,5,6,160,16
1890 DATA 169,0,141,3,6,185,0,144,157,
0,148,200,232,238,3,6,173,3,6,201
1900 DATA 16,208,238,173,1,6,141,0,208
,32,249,117,96,173,0,6,201,199,208,3
1910 DATA 104,104,96,96
1920 REM HOVERCRAFT SHAPE DATA
1930 DATA 0,0,0,0,60,126,126,42,42,84,
84,126,60,0,0,0
1940 DATA 0,0,0,0,60,126,126,84,84,42,
42,126,60,0,0,0,0
1950 REM VBI ML ROUTINE
1960 RESTORE 1990
1970 FOR I=0 TO 38
1980 READ A:POKE 1556+I,A:NEXT I
1990 DATA 104,169,6,160,31,162,6,32,92
,228,96
2000 DATA 238,100,6,173,100,6,141,1,20
8,206,101,6,173,101,6,141,2,208,238,19
7,2
2010 DATA 169,0,133,77
2020 DATA 76,95,228
2030 RETURN
2040 REM  LOAD CHARACTER SET
2050 DIM ML$(40)
2060 REM
2070 CHBASE=256*(136)
2080 RESTORE 2110:FOR L=1 TO 36:READ A
2090 ML$(L,L)=CHR$(A):NEXT L
2100 A=USR(ADR(ML$),136):POKE 756,136
2110 DATA 104,104,104,133,204,169,224,
133,206,162,0,160,0,177,205,145,203,20
0,208,249
2120 DATA 164,204,200,132,204,164,206,
200,132,206,232,224,5,208,232,96
2130 FOR I=0 TO 7:READ D
2140 POKE CHBASE+(26*8)+I,D:NEXT I
2150 DATA 77,239,255,191,127,235,224,1
12
2160 FOR I=0 TO 7:READ D
2170 POKE CHBASE+(27*8)+I,D:NEXT I
2180 DATA 52,247,235,221,255,171,64,0
2190 FOR I=0 TO 7:READ D
2200 POKE CHBASE+(28*8)+I,D:NEXT I
2210 DATA 112,160,240,208,224,176,112,
240
2220 FOR I=0 TO 7:READ D
2230 POKE CHBASE+(29*8)+I,D:NEXT I
2240 DATA 64,64,235,255,127,187,253,85
2250 FOR I=0 TO 7:READ D
2260 POKE CHBASE+(30*8)+I,D:NEXT I
2270 DATA 0,192,235,191,221,171,183,11
8
2280 FOR I=0 TO 7:READ D
2290 POKE CHBASE+(31*8)+I,D:NEXT I
2300 DATA 6,7,215,251,255,249,183,84
2310 FOR I=0 TO 7:READ D
2320 POKE CHBASE+(59*8)+I,D:NEXT I
2330 DATA 14,4,11,13,7,11,15,6
2340 FOR I=0 TO 7:READ D
2350 POKE CHBASE+(60*8)+I,D:NEXT I
2360 DATA 40,90,187,221,251,215,7,3
2370 FOR I=0 TO 7:READ D
2380 POKE CHBASE+(61*8)+I,D:NEXT I
2390 DATA 124,40,48,24,56,48,16,0
2400 FOR I=0 TO 7:READ D
2410 POKE CHBASE+(62*8)+I,D:NEXT I
2420 DATA 0,16,48,56,24,48,40,124
2430 FOR I=0 TO 7:READ D
2440 POKE CHBASE+8+I,D:NEXT I
2450 DATA 0,36,60,90,126,90,60,36
2460 RETURN
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM	LINE	CHSUM	LINE	CHSUM	LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	CP1 (Y)	320	D3U (J)	630	WYD (G)	940	LWV (L)	1240	Q3H (8)	1540	OE4 (Q)	1850	DPW (4)	2160	DXE (J)
20	CP2 (3)	330	QK9 (1)	640	ARJ (Y)	950	6LK (E)	1250	FV4 (P)	1550	PY2 (X)	1860	8DL (A)	2170	UG5 (H)
30	CP3 (X)	340	3RH (V)	650	RTA (K)	960	6QK (K)	1255	T2H (X)	1560	MLF (6)	1870	PVH (5)	2180	V8J (S)
40	CP4 (4)	350	PDS (G)	660	DLX (R)	970	NSP (E)	1260	OCF (8)	1570	JEU (X)	1880	DDE (O)	2190	E4E (A)
50	5UX (K)	360	96K (5)	670	URU (W)	980	MEV (N)	1270	XRU (2)	1580	JJ8 (2)	1890	EUJ (2)	2200	U65 (A)
60	TT4 (J)	370	5HW (P)	680	96C (E)	990	73K (E)	1280	4UX (P)	1590	EQH (Q)	1900	KUU (L)	2210	SD7 (5)
70	3YT (E)	380	18V (O)	690	152 (E)	1000	8AH (6)	1290	G4D (3)	1600	AL8 (7)	1910	3DP (W)	2220	DTE (N)
80	AD8 (4)	390	5VL (2)	700	P37 (A)	1010	QAM (E)	1300	PWP (Y)	1610	EYR (O)	1920	E6N (Y)	2230	UE5 (N)
90	65H (V)	400	CMF (3)	710	27T (G)	1020	NVT (6)	1310	O5P (O)	1620	RE2 (L)	1930	KKF (A)	2240	VPD (1)
100	9SX (S)	410	CYV (8)	720	RFC (O)	1030	8HH (E)	1320	DFN (7)	1630	QOX (6)	1940	L96 (N)	2250	EOE (H)
110	LA4 (A)	420	SY4 (3)	730	D7Y (9)	1040	8KH (7)	1330	DHN (O)	1640	HSK (G)	1950	EDN (P)	2260	UD5 (H)
120	5CQ (8)	430	Y1K (L)	740	16A (A)	1050	QFV (N)	1340	MC1 (9)	1650	JM5 (V)	1960	O3W (J)	2270	VDV (O)
130	D7S (7)	440	1L2 (7)	750	4D4 (R)	1060	P1F (L)	1350	3J1 (M)	1660	R7O (J)	1970	4NH (1)	2280	E6E (K)
140	XC1 (2)	450	PWR (H)	760	L5C (Y)	1070	8RH (S)	1360	FNX (M)	1670	Q6E (8)	1980	Q8H (X)	2290	UL5 (J)
150	DGS (F)	460	R5K (S)	770	WX6 (R)	1080	8TH (H)	1370	QQL (K)	1680	NDA (X)	1990	8DH (S)	2300	RWV (7)
160	1HF (J)	470	T62 (M)	780	DUY (M)	1090	Q1M (U)	1380	KV1 (K)	1690	QJ5 (V)	2000	MLT (G)	2310	DVE (Q)
170	J5U (Q)	480	R36 (7)	790	RJN (S)	1100	VFK (X)	1390	C58 (W)	1700	RNH (1)	2010	2NO (R)	2320	UN5 (P)
180	V25 (T)	490	ASC (1)	800	R6D (R)	1110	D4N (R)	1400	4SH (E)	1710	Q7P (D)	2020	OJ5 (E)	2330	EME (A)
190	7D9 (O)	500	XLY (7)	810	DOO (Y)	1120	HVN (G)	1410	2Q9 (A)	1720	9AH (4)	2030	VHL (C)	2340	E2E (U)
200	PGT (2)	510	CYW (E)	820	D4O (S)	1125	GLO (Y)	1420	KH1 (A)	1730	9DH (D)	2040	D6P (G)	2350	UM5 (T)
210	GJ7 (3)	520	XWL (V)	830	88M (6)	1130	SQ8 (5)	1430	AX8 (4)	1740	SOM (5)	2050	W52 (J)	2360	SKS (Y)
220	4MH (X)	530	PHN (8)	840	YVR (T)	1140	JGE (Q)	1440	51H (N)	1750	WHK (2)	2060	DAP (N)	2370	E8E (F)
230	OMO (W)	540	6FC (6)	850	9OA (4)	1150	OOC (R)	1450	2Y9 (L)	1760	E6N (6)	2070	A7U (S)	2380	UU5 (D)
240	5F3 (F)	550	UH7 (7)	860	P3J (U)	1160	3C5 (L)	1460	5AR (C)	1770	NH1 (G)	2080	DOG (K)	2390	GWL (Y)
250	2SA (F)	560	J1X (V)	870	S2D (S)	1170	O92 (R)	1470	G8M (6)	1780	CFC (X)	2090	PCT (A)	2400	DXE (D)
260	XTW (O)	570	MGW (E)	880	DVO (T)	1180	XPN (X)	1480	DXN (O)	1790	CK7 (1)	2100	4XS (U)	2410	UK5 (G)
270	DQT (F)	580	95K (K)	890	Y7K (G)	1190	XSL (T)	1490	3ER (N)	1800	CFO (S)	2110	XFD (6)	2420	G9Q (G)
280	CF8 (O)	590	QEN (1)	900	LXD (J)	1200	YY6 (N)	1500	6CO (X)	1810	C5F (V)	2120	8KU (6)	2430	E4E (V)
290	DYT (9)	600	QJD (Q)	910	63K (E)	1210	RCV (Y)	1510	WOK (S)	1820	E9O (2)	2130	DRE (Q)	2440	SFC (W)
300	NR1 (G)	610	CYX (X)	920	67K (H)	1220	XJL (O)	1520	DPN (W)	1830	DTY (D)	2140	U85 (P)	2550	GSY (G)
310	7G6 (V)	620	UVP (2)	930	N9P (E)	1230	WCT (V)	1530	DRN (S)	1840	D2D (N)	2150	VGN (1)	2460	W6L (A)

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SOFTWARE Solutions

Your programming problems solved by ANDRÉ WILLEY

THIS month the first letter comes from Bryan Kennerley who is based at Rhyl in Wales. He has a few questions about some puzzling aspects of the Atari floppy disc system.

I am currently writing a disc sector editor and while doing so I have uncovered a few unusual phenomena. Firstly, on reading the directory of Alternate Reality – The City (disc 1, side 1), two directories appear to be displayed in a random order.

Investigation reveals that on reading the directory sectors (361 to 364) the same thing occurs. How can these sectors hold one set of data on one pass and a completely different set on the next?

Also, while writing the DLI routines I made extensive use of the Dos 2.5 ramdisc on my 130XE, and in doing so I discovered a seemingly pointless function. If a working DLI is disabled by setting bit 7 of location 54286 to zero (using POKE 54286,64) before accessing a D8: ramdisc file, the DLI miraculously springs back into life again. Is this essential to the ramdisc's operation, or is it just a bug?

I would like to include in my program the capability to detect, examine and create bad sectors – but to do so I need to know what one is. What makes them different to ordinary sectors and how are they created?

As far as the DLI part of your question goes, the answer is probably a slip up on the part of the authors of Dos 2.5. When the ramdisc is accessed various portions of rom and ram are switched in and out of the memory map, and the operating system must always be deactivated before attempting to do such bank selection operations.

This involves turning off both the Vertical Blank and Display List Interrupts (VBIs and DLIs) by setting location 54286 to zero. Normally the original contents would be stored temporarily on the stack, but in this case that doesn't seem to happen and the value 192 is restored after the Dos call – re-activating any DLIs as well as the required VBI system.

The other part of your letter requires a greater understanding of the way in which an Atari disc drive works.

Although we tend to think of disc sectors as being numbered sequentially from 1 to 720, the disc drive actually sees them rather differently. It deals with the disc as 40 separate tracks with each containing 18 sectors of data (or 26 if you're using an enhanced density disc).

Each sector within a track is assigned a number between 1 and 18 so when you ask to read a given disc sector, the number you specify must first be converted into track and sector references – and only when the disc drive's read/write head is positioned over the correct track can the sector offset value be used to read in the correct data.

For example, if you try to access sector 18 the drive looks on track 0 for the sector numbered 18. Similarly, sector 19 would actually be at track 1/sector 1 and so on up to sector 720 which is really track 40/sector 18.

Some manufacturers use a special timing hole punched into all 5.25in discs to work out where each sector occurs within a track. Atari, however, opted for a software approach and each sector has a short block of header data which provides the sector reference number and some error prevention checksum data.

What you have come across is a method of copy protection used by some disc manufacturers. As you have observed, the first directory entry is located at sector number 361, which is in fact the first sector of track 20. Whenever you ask for a directory (from sector 361) the drive head moves straight to track 20 and starts reading each sector in turn until it finds one with a header value of one.

As soon as it finds the correct header it knows that it must send the next 128 bytes of data directly to your micro. Finally, all the data bytes are added together and compared with the original checksum digit found in the header, and only if the two numbers match will the transfer be considered complete.

The drive expects there to be 18 individual sectors, each with a unique number, but it is theoretically possible to have more than one sector with the same reference number – it being pot luck which one the drive arrives at first. Some discs even contain 18 sectors, all with the same number – giving 18 possible sets of data for one official sector number.

There are obviously some devious ways of contriving to read a specific sector out of the 18 present, but there is no point going into detail because there is absolutely no way in which you can create a disc like this with a normal drive. Software manufacturers use some very special pieces of equipment to make such discs, and the program won't run unless this custom format is present.

The same applies to so-called *bad* sectors, which are often physically damaged or given incorrect checksum digits – thus returning a disc read error even when there may be 128 bytes of good data present. Once again, you can't create these with a normal drive – indeed Atari has provided you with an awful lot of circuitry to prevent the possibility of any bad data being recorded on a disc.

Of course, you are a responsible Atari owner, and wouldn't be interested in actually *copying* such things anyway, would you? That would be both illegal and immoral, and is the

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reason why such weird and uncopyable data formats were created in the first place. Here endeth today's lecture!

SuperScript puzzle

On now to a letter from the Netherlands, from **Th.P.J. Bloks**:

Last August I bought the SuperScript word processor which I had seen advertised in Atari User, and which I am generally very happy with.

However, a few days ago I was rereading your March 1986 issue containing the SuperScript review in which the reviewer mentions a bug with the Return character (13) versus the normal Atari code of 155.

As I had already encountered the problem of printing a text file to disc I was glad to get an answer to this problem, so I decided to follow the reviewer's advice and alter the 13 on my work disc defaults file, and in the Epson file on the master disc.

I booted up SuperScript and loaded the Epson printer driver and changed the Return number 13 to 155. Then I used the Document Replace option to write the printer driver back to my disc and put the program away.

The following day I tried to boot SuperScript and I could only get the READY prompt or the Self-Test menu. Upon checking the disc I found that the first three files, the ones with hearts in the directory, had been deleted. I then used the Restore option from my modified Dos 2.9, and now the defaults file seems to contain some 800 sectors – but the disc still doesn't boot.

I hope that you can offer me a solution as to how to get SuperScript working again, or print a warning in your magazine for other readers so it won't happen to anyone else.

As you have by now realised, it's always a mistake to write anything to a master disc unless you've first made a backup of it. Since SuperScript is heavily copy-protected, it's best to assume that you just don't write anything to it at all.

What you should have done is to write your new defaults file on to your work disc, and not used the original version on the master disc at all. As you have discovered, your master is now corrupted and you should send it back for a replacement (although you will probably have to pay the media cost – somewhere around £3 to £5 sounds reasonable).

The first three boot files on the disc were originally hidden from view by altering their respective directory entries, so when you tried to write a new file on to the disc the first blank entry was assumed to be empty and re-used, thus corrupting the hidden DOS.SYS file.

I reckon that such techniques should not be used on business programs, and you should not only be allowed to but be positively encouraged to take backups of your master discs. After all, you've paid out your £50 and the program is now useless through no real fault of your own. I hope you get it sorted out soon, and perhaps software houses will ensure that future versions of such programs will be released in non-protected forms, as they already are on the ST.

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5 LINERS

Recently our readers have been sending us Five Liners that have been getting more clever and imaginitive by the day. They're finding lots of ways to cram more and more code into the tight space available. So here are a couple of tips to help you enter the long lines.

Firstly, enter POKE 82,0 to remove the left hand screen margin. This allows you to enter four lines of Basic on the screen. You should also leave out all unecessary spaces.

Whenever possible use the abbreviated form of the commands. Some common ones are:

GRAPHICS	GR.
FOR	F.
NEXT	N.
SOUND	SO.
GOTO	G.
DATA	D.

ENHANCED ON-SCREEN EDITOR
from Karl Fitzhugh

HOW often have you been setting up a Graphics 0 title screen when you've had to strain your eyes to count the characters to the left of the cursor in order to work out coordinates for a POSITION statement?

Or how many times have you had to dig out your trusty manual to look up the internal code for a character when you needed to POKE it directly to the screen?

This Five Liner solves both of these problems. It sets up a machine code routine residing in Page 6 – locations 1536 to 1717 – that executes during the vertical blank period – VBI – so make sure that your program doesn't use this area of memory. An extra line of text is added at the top of a Graphics 0 screen which shows the current row and column of the cursor, as well as the internal character set code for the character currently under the cursor.

Once you have typed it in, save a copy before running it as any mistakes in the DATA statements could cause the computer to crash. After the program is run you can type NEW to delete the Basic from memory and call the routine by typing X=USR(1576).

If you press Reset or execute a Graphics 0 command you will have to call it again but don't call it from any other mode or you will just get garbage on the screen.

```
1 DATA 0,35,47,44,0,29,0,16,16,0,0,50,
47,55,0,29,0,16,16,0,0,35,40,33,50,51,
37,52,0,35,47,36,37,0,29,0,16,16,16,0,
104,162
2 DATA 147,160,6,142,48,2,140,49,2,166
,88,164,89,142,154,6,140,155,6,162,6,1
60,71,169,7,32,92,228,96,165,93,32,134
,6,105
3 DATA 26,141,38,6,138,32,134,6,105,26
,141,37,6,24,138,105,16,141,36,6,165,8
4,32,134,6,105,26,141,18,6,24,138,105,
16,141
4 DATA 17,6,165,85,32,134,6,105,26,141
,8,6,24,138,105,16,141,7,6,76,98,228,1
62,0,56,233,10,144,4,232,76,137,6,24,9
6,112
5 FOR I=1536 TO 1717:READ B:POKE I,B:N
EXT I:DATA 80,66,0,6,16,66,64,156,2,2,
2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,
2,2,65,147,6
```

Get it right!

1 LL6 (L)
2 RRM (V)
3 NMC (O)
4 TLG (4)
5 7NS (D)

PERCEPTION
from George Postler

TEST your reaction speed to a given situation by playing this fun-to-use program. Pressing Start begins the game and the micro displays two numbers on the screen for a short time. If you recognise them as being the same press the fire button on your joystick, which should be plugged into port one.

If you are quick enough and the numbers are still the same the computer will award you one point but if you are wrong your attempts left will be reduced by one. After five goes the game will end and your final total will be displayed.

PROGRAM BREAKDOWN

1. Sets up a Graphics Mode 2+16 screen and tests for Start to be pressed
2. Generates and prints the two random numbers and tests for the trigger to be pressed
3. Speeds up the game, prints the score and your number of attempts
4. Tests whether *X* is the same as *Y*, subtracts attempts and returns to line two
5. Adds one point and returns to line two

```
1 GRAPHICS 18:K=100:? #6;"PRESS START"
:POSITION 6,10:? #6;"YOUR SCORE=";B:P=
5:GRAPHICS 18:ON PEEK(53279)<>6 GOTO 1
:B=0
2 X=INT(RND(0)*10):Y=INT(RND(0)*10):PO
SITION 7,5:? #6;X:POSITION 11,5:? #6;Y
:FOR W=0 TO K:S=STRIG(0):ON S=0 GOSUB
4:NEXT W
3 K=K-0.1:POSITION 4,0:? #6;"YOUR SCOR
E=";B:POSITION 5,11:? #6;"attempts ";P
:ON P<=0 GOTO 1:GOTO 2
4 IF X<>Y THEN P=P-1:FOR W=0 TO 100:SO
UND 0,W,4,10:NEXT W:SOUND 0,0,0,0:RETU
RN
5 B=B+1:FOR W=0 TO 200:SOUND 0,W,10,10
:NEXT W:SOUND 0,0,0,0:RETURN
```

PROGRAM VARIABLES

X, Y	The two random numbers
P	Number of attempts made
B	Score
K	Controls the speed of the game

Get it right!

1 27Y (O)
2 AUU (P)
3 VN4 (Y)
4 J45 (W)
5 8GK (H)

Win £25

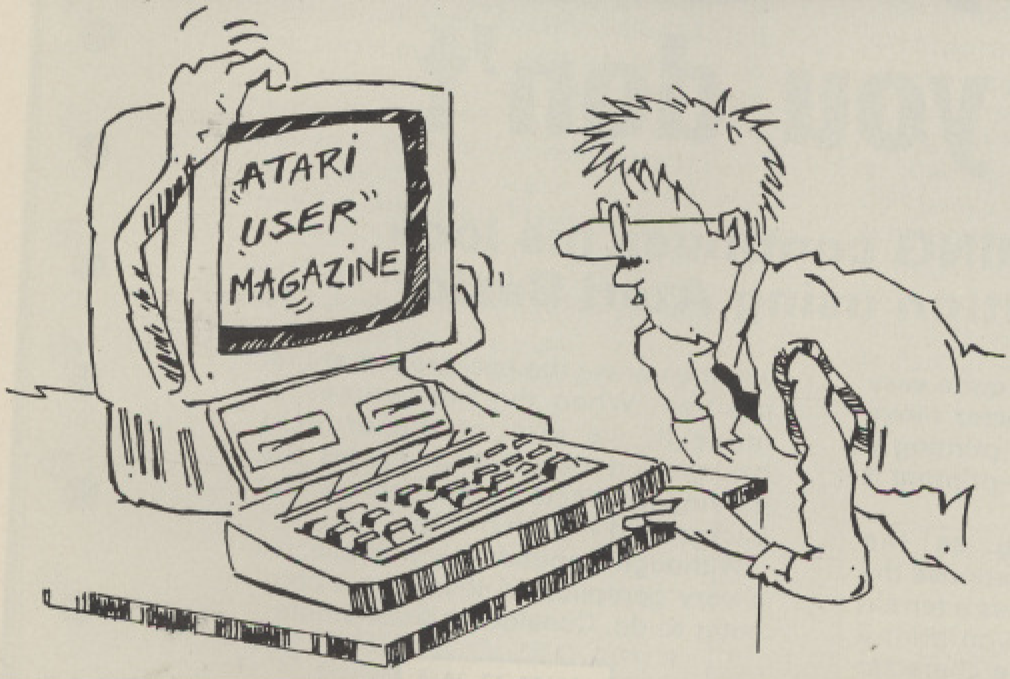
IF you've written any useful or interesting five line programs why not send them to us to grace our pages?

We pay £25 for each one published.

You should give a full description of the routine and any other details that are relevant. And remember if you want your material returning please enclose a suitably stamped package.

Simply send a copy of the program on disc or tape together with the documentation – preferably as a word processed file – to:

Atari User, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.



LACE
from Damon Burroughs

HERE'S a super little program that will show you just how easy it is to create colourful graphics on your Atari. The finished three-colour picture is drawn in eight parts – mirrored in the specified colour.

When the program has finished it holds the pattern for a short while and then starts it again. Also included is a short sound effect which can be heard as the screen is drawn.

PROGRAM BREAKDOWN

- **10** Sets up sound, colour and graphics mode and then draws the first stage of the computer lace
- **20** Draws the second stage, changes the colours for the next two and then draws stage three
- **30** Draws the fourth stage, changes the colour for the next four and then draws stage five
- **40** Draws stages six and seven
- **50** Draws stage eight, switches off the sound, holds the lace design for a few seconds and then loops back to line 10 to re-draw the pattern

```
10 SOUND 1,150,150,12:GRAPHICS 15+16:C
OLOR 1:FOR X=0 TO 159 STEP 5:PLOT 79,0
:DRAWTO X,79:NEXT X:FOR X=0 TO 159 STE
P 5
20 PLOT 79,190:DRAWTO X,79:NEXT X:COLO
R 2:FOR X=0 TO 159 STEP 5:PLOT 79,120:
DRAWTO X,79:NEXT X:FOR X=0 TO 159 STEP
 5
30 PLOT 79,60:DRAWTO X,79:NEXT X:COLOR
 3:FOR X=0 TO 159 STEP 5:PLOT 2,0:DRAW
TO X,79:NEXT X:FOR X=0 TO 159 STEP 5
40 PLOT 158,0:DRAWTO X,79:NEXT X:FOR X
=0 TO 159 STEP 5:PLOT 155,190:DRAWTO X
,79:NEXT X:FOR X=0 TO 159 STEP 5
50 PLOT 2,190:DRAWTO X,79:NEXT X:POKE
53768,15:FOR D=0 TO 1000:NEXT D:GOTO 1
0
```

Get it right!

10 5GD (C)
20 7A8 (Q)
30 7UJ (1)
40 OAF (Q)
50 SFY (6)

BOUNCE DEMO
from Keith and Joel Goodwin

THIS program proves that you can achieve smooth fine scrolling without having to use complex assembly language. Instead it simply manipulates the display list to do the trick equally as well.

When you first run it, the message ATARI USER MAGAZINE! will bounce up and down the screen very smoothly with none of the jerkiness that usually occurs with on-screen character animation. After a short while it slows down until it stops at the bottom of the display: Then it starts all over again.

```
1 Z=112:GRAPHICS 17:POKE 559,0:S=53760
:G=PEEK(560):I=PEEK(561):D=G+I*256:L=P
EEK(D+4):H=PEEK(D+5):FOR P=3 TO 22:POK
E D+P,0
2 NEXT P:POKE D+23,71:POKE D+24,L:POKE
 D+25,H:POKE D+26,65:POKE D+27,G:POKE
D+28,I:? #6;"ATARI USER MAGAZINE!":POK
E 712,48
3 POKE 559,34:FOR B=0 TO 15 STEP 0.2:P
OKE 708,224+B:POKE 53760,B*10:POKE 537
61,192+B:POKE 53768,1:NEXT B:SOUND 0,0
,0,0:SOUND 1,0,0,0
4 FOR Q=P-1 TO 3 STEP -1:FOR R=0 TO Z
STEP 16:POKE D+Q,R:NEXT R:NEXT Q:P=P-2
:IF P<0 THEN FOR A=0 TO 700:NEXT A:RUN

5 FOR B=15 TO 0 STEP -3:SOUND 0,10,8,B
:NEXT B:FOR Q=3 TO P-1:FOR R=Z TO 0 ST
EP -16:POKE D+Q,R:NEXT R:NEXT Q:FOR B=
15 TO 0 STEP -3:SOUND 0,5,8,B:NEXT B:G
OTO 4
```

PROGRAM BREAKDOWN

- **1** Sets up the display list, disables the screen and sets up the variables
- **2** Finishes the display list and prints a message
- **3** Re-enables the screen and fades in the message with sound effects
- **4** Scrolls the message down, lowers the height of the next bounce and checks whether the message has stopped bouncing at the bottom
- **5** Makes the sound of the message hitting the bottom, scrolls the message up and makes the sound of hitting the top of the screen

Get it right!

1 4P4 (F)
2 EL6 (D)
3 483 (F)
4 LKT (P)
5 LPJ (O)

VARIABLES

G, I	Low and high bytes of the display list
D	Location of the display list
L, H	Low and high byte pointers to the screen memory
P	Holds the height of the current bounce
Q, R	FOR...NEXT loop counters

Now you see it, now you don't

LEN GOLDING continues his look at animation using Atari Basic

AS we saw last month, it's quite easy to make a keyboard character move around the screen by just printing a blank space over it, then re-printing it somewhere else.

This is fine as long as the background is blank, but suppose the character has to move across a terrain map or other scenery? If you print a blank space every time the character moves, it will leave behind it a trail of missing background.

The theory behind overcoming the problem is straightforward: We first look to see where our moving character is about to land, find what's currently printed there and store the information in a safe place.

Next we print our character, which will then erase the background at that position. When the time comes to move it, we re-print the original background data, which erases the moving character and restores the background – all in one go.

Although it sounds fairly simple, it's a very complicated thing for a computer to do. Consider this statement:

```
LOCATE 10,20,Q
```

In ordinary English, it means: *Move the cursor to a position 10 columns in from the left and 20 rows down. Read the character currently occupying that spot and store its code number in a variable called Q.*

If, for example, the letter A is cur-

```
10 REM Program I: 8-directional joysti
ck-controlled movement over a backgrou
nd.
20 GRAPHICS 0:REM Necessary for LOCATE
 command to work
30 POKE 752,1:? CHR$(125):REM turn cur
sor off and clear screen
40 H2=19:V2=11:REM Initial Horizontal
and Vertical co-ordinates for ball
50 GOSUB 350:REM Fill the screen with
a background of letters
60 GOTO 100:REM Start loop, printing t
he ball at its initial position
70 REM main loop starts here:
80 GOSUB 150:REM Get new horizontal an
d vertical co-ordinates.
90 POSITION H1,V1:? CHR$(Q):REM erase
ball by printing background over it
100 LOCATE H2,V2,Q:REM Store backgroun
d character on which the ball will lan
d
110 POSITION H2,V2:? CHR$(20):REM Prin
t the ball
120 H1=H2:V1=V2:REM Reset H1 and V1 to
 new position, ready for next cycle
130 GOTO 80
140 REM Subroutines start here:
150 S=STICK(0):REM Read position of jo
ystick in port 1
160 IF S=15 THEN GOTO 150:REM Do nothi
ng if stick centralised
170 REM Find next position for the bal
l to be printed:
180 IF S=14 THEN GOSUB 270:GOTO 260:RE
M Up only
190 IF S=6 THEN GOSUB 270:GOSUB 310:GO
TO 260:REM Up/right
200 IF S=7 THEN GOSUB 310:GOTO 260:REM
 Right only
210 IF S=5 THEN GOSUB 290:GOSUB 330:GO
TO 260:REM Down/right
220 IF S=13 THEN GOSUB 290:GOTO 260:RE
M Down only
230 IF S=9 THEN GOSUB 290:GOSUB 330:GO
TO 260:REM Down/left
240 IF S=11 THEN GOSUB 330:GOTO 260:RE
M Left only
250 IF S=10 THEN GOSUB 270:GOSUB 330:R
EM Up/left
260 RETURN
270 IF V1>1 THEN V2=V1-1:REM Prepare t
o move up, if there's room
280 RETURN
290 IF V1<22 THEN V2=V1+1:REM Prepare
to move down, if there's room
300 RETURN
310 IF H1<38 THEN H2=H1+1:REM Prepare
to move right, if there's room
320 RETURN
330 IF H1>1 THEN H2=H1-1:REM Prepare t
o move left, if there's room
340 RETURN
350 FOR ROW=1 TO 22:FOR COLUMN=2 TO 37
360 POSITION COLUMN,ROW:? CHR$(ROW+64)
370 NEXT COLUMN:NEXT ROW
380 RETURN
```

Program I: Example of joystick control

rently sitting at coordinates 10,20 the value stored in *Q* will be 65 – the Ascii code for A.

As always, you can change either or both coordinates to any value within the corresponding screen boundary, and variable *Q* can have any legal name you choose.

Here's how it works in practice, using the ball – Ascii 20 – as our moving character. We'll let the ball's current position be *H1,V1* and its new position *H2,V2*. Also, for convenience, let's pretend the values for *H2* and *V2* are updated by an imaginary subroutine at line 1000. Our program might look like this:

```
10 GRAPHICS 0
20 H2=10:V2=20
30 GOTO 60
40 GOSUB 1000
50 POSITION H1,V1:PRINT CHR$(Q)
60 LOCATE H2,V2,Q
70 POSITION H2,V2: PRINT CHR$(20)
80 H1=H2:V1=V2
90 GOTO 20
```

We start the program by telling the computer what graphics mode we're using. It's essential to do this, or the LOCATE command won't work. Next we specify the ball's starting position *H2,V2*, then jump into the middle of the main loop at line 60.

This line reads the background character at our ball's initial position and stores it in *Q*. Line 70 prints the ball, and line 80 sets *H1* and *V1* to the ball's current coordinates. Line 90 then sets the game loop running. Line 40 executes our joystick subroutine, and returns with the ball's new coordinates in *H2,V2*.

Line 50 erases the ball by restoring the original background data – the character whose Ascii code is held in *Q*. Line 60 identifies the background character which is currently sitting at the ball's new destination – *H2,V2* – and stores its Ascii number in *Q*, replacing the previous value. Line 70 prints the ball at *H2,V2*, and this is where we came in.

The whole process will repeat until we stop the program by pressing Break or Reset, or switching power off.

Program I is a fully working demonstration that's similar to last month's Program IV, but we've rearranged things to give you a bit more practice with subroutines. Notice that the joystick control system – lines 150 to 340 – is now nested. The first subroutine (150 to 260) calls other subroutines (270 to 340) as necessary, before returning to the main-line code at line 110.

Because lines 150 to 340 are now a self-contained mini-program, you can incorporate the routine easily into your own games.

The screen background – a pattern of capital letters – is also drawn by a subroutine, this time at line 350. You can easily change it to draw any pattern or background you choose – a haunted house or dungeon floor plan, for example – using control characters. The utility program we gave you in Part III – the March 1988 issue of

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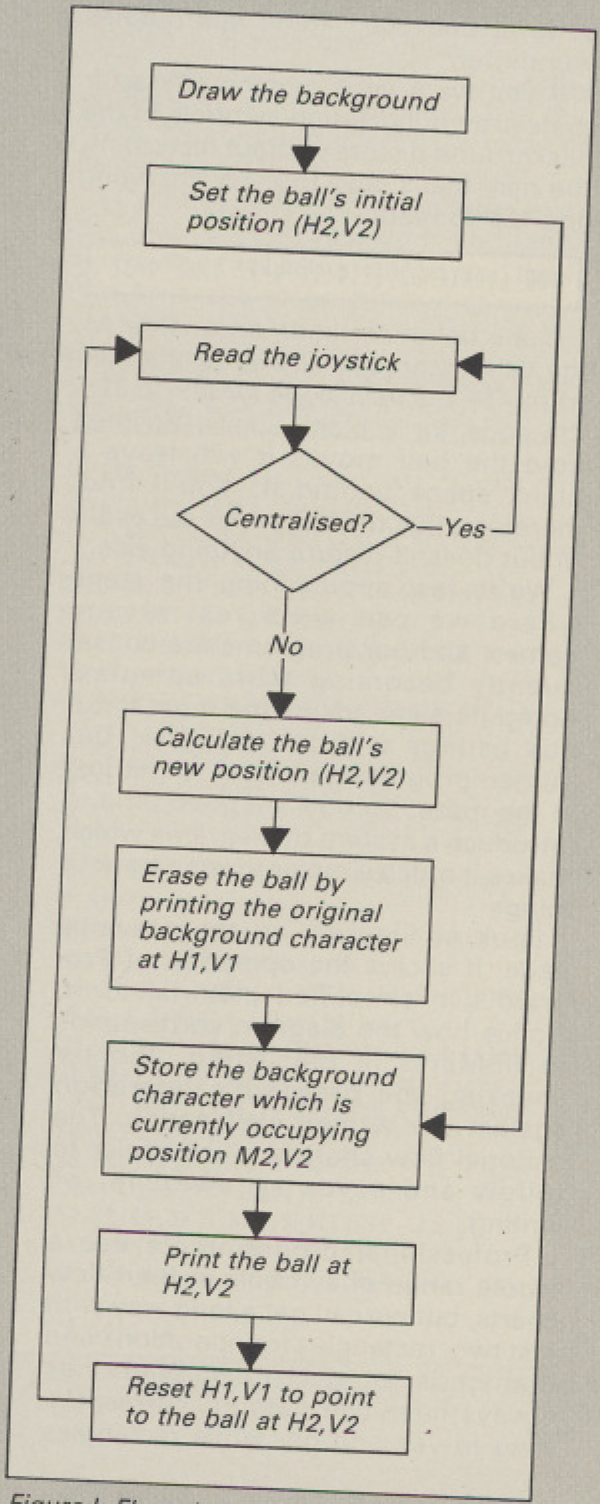


Figure I: Flow chart describing Program I

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Atari User – takes the drudgery out of this.

Another use for LOCATE is to detect when your moving character has hit a target of some kind. Try adding these lines to Program I:

```
115 IF Q=72 THEN GOSUB 500
500 SOUND 0,150,10,8
510 FOR W=1 TO 20:NEXT W
520 SOUND 0,0,0,0
530 RETURN
```

Now you'll get a short beep whenever the moving ball lands on a letter H. If you want the hit to produce a more exciting result, just change the code at line 500. Aren't subroutines wonderful?

If you want your moving character to destroy only certain symbols in the background picture without disturbing the rest, that's easy too. Try changing line 100 to read:

```
100 LOCATE H2,V2,Q:IF Q=77 THEN Q=32
```

If the ball now lands on a letter M, the value stored in *Q* will be changed from 77 – the Ascii code for M – to 32 – the code for a blank space. So next time the ball moves it will leave a blank space behind it. You'll find, therefore, that the ball wipes out every M but doesn't disturb anything else.

We're fast approaching the stage where we can write real arcade games, and our programs are consequently becoming more complex. Computers can follow the most tortuous listings without difficulty, but human programmers tend to get lost in the maze. So now's a good time to introduce a system of diagrams which makes it much simpler to keep track of things.

Look at Figure I on the previous page. It shows the operation of Program I in simplified pictorial form. Notice how the diagram corresponds to REMarks in the listing, and try checking the program's operation against our written explanation. The pictorial flow chart is much easier to follow and saves an awful lot of writing.

Professional programmers use a whole range of symbols in their flow charts, but we can get a long way with just two, rectangles for operations and diamonds for decisions. Diamonds always have two outputs, corresponding to yes and no, while rectangles have only one, corresponding to done.

Basic is one of the few languages that doesn't demand an accurate flow chart before you start programming – it's very tolerant of variations in construction and layout. As your programs become more complicated, however, you'll find that time spent on designing it – by flow chart or other methods – will save many hours of trial and error and the end result will be tidier, shorter and probably faster.

Now let's turn to a topic that will help you to produce more realistic games – the use of colour. Deep inside your Atari is a group of memory addresses called colour registers. Whenever the computer draws a screen they tell it which colours to use and what to use them for. You can change the contents of the registers, and consequently the colours displayed by using SETCOLOR.

For convenience – and to avoid misspelling – this command can be abbreviated to SE. – Basic will write it out in full when the program is LISTed: Its format looks like this:

```
SETCOLOR 1,2,8
```

The first figure after SETCOLOR identifies which register we want to alter. In Graphics 0 we can use only registers 1, 2 and 4 but these enable us to change text brightness, background colour and border colour respectively.

The second figure specifies the colour – or hue – to be used and can have any value from 0 to 15. Figure II shows the hues available using Atari's own words, but you may disagree with the descriptions. In any case there's no absolute standard – many TVs and computers will inevitably produce different results.

The third and final figure in a SETCOLOR command controls the colour's brightness, and it can be any even number from 0 to 14. Changing this level has a marked effect on the perceived colour. For example:

```
SETCOLOR 2,12,0
```

will turn the background a dark green, whereas:

```
SETCOLOR 2,12,14
```

will turn it bright yellow, even though the hue number is the same – 12 – in both cases.

Program II lets you use a joystick to

experiment with colour registers 1, 2 and 4. Press the trigger to step from one register to the next, move the stick up or down to change the hue value, and move it left or right to change the brightness level. If things get out of hand, pressing Reset will automatically restore the screen to its normal condition.

All our programming so far has been done in Graphics Mode 0, which is comparatively limited in its use of colour.

Text is always printed in the same hue as its background, but at a different brightness level. You can make it very dark, very bright or invisible, but that's about the limit to special effects.

For genuine multi-colour displays we must enter a new dimension:

```
10 GRAPHICS 1
20 PRINT #6;"TeSt"
```

When you run this something very peculiar occurs: The screen first goes blank then splits into two parts – a large black area, and a smaller blue one at the bottom – with the normal READY message printed in the blue area as it would be on a Graphics 0 screen.

The word TEST appears in large letters at the top of the black area, but instead of being printed exactly as in line 20, all the letters are in upper case and each is a different colour.

Change line 10 to GRAPHICS 2 and something similar happens, but this time the coloured letters are twice as large.

If you've followed this series from the first part you now know enough to write your first action game, and that's the best way to practise what you've learned.

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0	Black
1	Rust
2	Red-Orange
3	Dark Orange
4	Red
5	Dark Lavender
6	Cobalt Blue
7	Ultramarine Blue
8	Medium Blue
9	Dark Blue
10	Blue-Grey
11	Olive Green
12	Medium Green
13	Dark Green
14	Orange-Green
15	Orange

Figure II: Colour values – second parameter in a SETCOLOR statement

```
10 REM Program II: Experimenting with
Colour registers in Graphics 0
20 POKE 752,1:? CHR$(125):REM Clear sc
reen and make cursor invisible
30 R=4:HUE=0:SHADE=0:GOTO 140:REM Init
ialise colour variables
40 IF STRIG(0)=1 THEN GOTO 80:REM Bran
ch if trigger not pressed
50 IF R=1 THEN R=2:GOTO 140:REM select
 next colour register
60 IF R=2 THEN R=4:GOTO 140
70 IF R=4 THEN R=1:GOTO 140
80 S=STICK(0):REM Read joystick in por
t 1
90 IF S=15 THEN GOTO 40:REM Loop back
if stick centralised
100 IF S=14 THEN IF HUE<15 THEN HUE=HU
E+1:GOTO 140:REM Joystick "up"
110 IF S=13 THEN IF HUE>0 THEN HUE=HUE
-1:GOTO 140:REM Joystick "down"
120 IF S=7 THEN IF SHADE<14 THEN SHADE
=SHADE+2:GOTO 140:REM Joystick "right"
130 IF S=11 THEN IF SHADE>0 THEN SHADE
=SHADE-2:REM Joystick "left"
140 POSITION 3,10:? "COMMAND = SETCOLO
R ";R;",";HUE;",";SHADE;"  "
150 SETCOLOR R,HUE,SHADE:REM Change th
e screen colour as ordered
160 FOR W=1 TO 50:NEXT W:REM Short del
ay
170 GOTO 40
```

Program II: Colour demonstrator

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Putting it into practice

As an exercise, try designing and writing a program to meet these specifications:

- *Turn the background brown with a green border and use Control characters to draw a city street plan.*
- *Insert fuel dumps, airfields and shipyards, represented by the letters F (Ascii 70), A (Ascii 65) and S (Ascii 83).*
- *Use a + character (Ascii 19) to fly around the screen under joystick control, without disturbing the background.*
- *Whenever the joystick trigger is pressed, make the sound of a falling bomb. If the cross is covering an A, F or S, add an explosion sound and leave a blank space behind when the cross moves.*
- *Near the bottom of the screen, print the number of bombs dropped and the number of hits achieved, updating this every time the trigger is pressed.*
- *End the game after 20 bombs have been dropped.*

This will be a pretty complicated program, so don't expect to solve all the problems overnight. Try to get the first three steps working correctly first, using the subroutine from Program I for joystick control – Program II will give you a hint on how to incorporate the trigger feature.

The next two can be added as subroutines later, but the last step is best included as part of the mainline code. If you can make it all work and understand its operation, you're well on the way to mastering Basic.

● Next month we'll explain what's happening in our demonstration and show how easy it is to produce multi-coloured animated displays.

£10 LETTER

DEEPER INTO THE DUNGEON

I THINK that I may be in a position to help Mr C. V. Howarth solve his problem with Alternate Reality: The Dungeon that he mentions in the Hints and Tips section of the March 1988 issue of Atari User.

Firstly, the item which he needs to use to pass through deaths doors is the portal access card.

This will be given to him by Acriminiral in exchange for the staff pieces from the prisoner on level one, King Danjor on level two and the dragon on level three – it requires the bloodstone before it will give up its piece.

Secondly, the River Stonz may be crossed at any time after midnight and before the first hour, provided that the boatman is paid with copper.

Thirdly, Morgana's tiara should not be given up to the clothes horse on level two. By wearing the tiara lost hit points are restored.

The clothes horse will settle for a sweater or a cloak provided you have nothing better, otherwise it will take your finest item of clothing – especially if it's magical.

Finally, does anyone know the name of the gargoyle on level three? – **Mike Ward, Warley, West Midlands.**

Crashing worksheets

AFTER reading the review of the Swift Spreadsheet from Audiogenic in the March 1988 issue of Atari User *I thought I'd point out a problem that I am having with it.*

When you are saving and loading worksheets they appear to save accurately and load every cell properly. However, problems occur when the worksheet is then worked on further – the program is prone to crashing with odd garbaged messages appearing.

This bug does not occur all the time, but is quite common and very frustrating.

The spreadsheet is potentially powerful and easy to use, and offers good value for money when you compare it to the more expensive VisiCalc and SynCalc.

I have written to Audiogenic but received no reply and I have talked over the phone to Metamorphosis Development – the designers of the spreadsheet – who were helpful but unable to cure my problem. – **W. Charles, Winch Wen, Swansea.**

● Have any of our readers experienced this problem? If you know the cure, please write in.

Getting that hash

I AM very flattered that my letter was chosen for publication in the March 1988 issue of Atari User. *I found your attached comment, however, didn't seem to square with my experiences at the keyboard.*

I have an 800XL linked to a 1050 disc drive chained to a Panasonic KXP-1081 printer via a graphics interface.

If I use the AtariWriter word processor I found, as you say, that the hash sign is printed out as a £ but displayed on screen and again in preview mode as a hash.

Using Mini Office II, however, if I key hash – Shift+3 – the pound sign appears on the screen, even if the printer is switched off and disconnected from the micro. It is also output in both preview and print modes. Finally, your reply to one of the letters in the March issue surprised me.

Although the SMM804 is not a commonly advertised printer for the 8 bit Atari, it will work correctly for text if a Centronics type interface is connected. – **J.E. Robinson, Millom, Cumbria.**

Keys still available

WHEN I read the mailbag section in the March 1988 issue of Atari User *I noticed a letter from someone who is having the same problem as me – broken keys on their 1010 tape recorder.*

I wrote to Silica Shop – enclosing a postal order for the required amount – but I was most upset when they wrote back to inform me that they had stopped selling replacement 1010 keys.

After a dozen or so phone calls I found someone who sells them – A. S. Wooten & Son, 116 Edleson Road, Crewe, CW2 7HD. The keys are £1.50 each and £1.50 postage and package for up to four keys is required.

Could you please tell me if a tape version of Monopoly is available and where I can get it? – **Bryan Poll, Barnsley, South Yorkshire.**

● We've checked with Silica Shop and it still sells the keys. They are £1.12 each and £1.50 postage and package must be included.

We don't think there is a tape version of monopoly.

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EACH month we will award £10 prizes for the most interesting letters sent to us.

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Mini Office II on SpartaDos

I HAVE a 1050 disc drive with a US doubler fitted and

Turn to Page 56 ►

DOUBLE TROUBLE

I HAVE just typed in the excellent 3D Plotter program from the March 1988 issue of Atari User *and I came across what seems a slight error in the listing: Line 800 has been duplicated and it re-appears on line 790. It should read:*

```
790 PLOT X(POINT,1)+160,Y(PO
INT,1):DRAWTO MPX,MPY
```

Once this has been altered it runs correctly. Thanks for a superb program – it has brought many hours of fun.

Has any reader figured out how to dump the 3D image to an Epson or 1029 printer? – **Mark Wilkie, Marske by the Sea.**

● Unfortunately, as the magazine was put together the listing was scrambled slightly.

We are sorry for any inconvenience caused.

◀ From Page 55

I was wondering if it is possible to transfer my Mini Office II files to a SpartaDos format.

It would be nice to have the high speed load facility on such a super program. – **Alexander Mellor Brooke, Cheadle Hulme, Cheshire.**

● Mini Office II works very well on nearly all disc operating systems including SpartaDos.

MAPS COME IN HANDY

I WOULD like to thank you for the excellent article about Spellbound that appeared in the March 1988 issue of Atari User.

Not only was the map very well presented, but the hints and tips were very useful in allowing me to complete this super mini-adventure for the first time.

Also in the same issue was the map of Mercenary: The Second City. Although I have never played this particular graphics adventure I am now thinking about getting it as the map makes it look like a very enjoyable game. The reviews section is always a firm favourite of mine and I was overjoyed when you started to use colour pictures again. The new layout looks superb as does all the magazine.

Thanks for a very interesting and informative read. – **Sean Canning, Manchester.**

Cartridge connection

I USE an assembler/editor cartridge quite a lot and find that I am having to continually plug it in or out to program in Basic.

I am concerned that the wear and tear on the edge connector will ultimately lead to unreliability.

Would it be possible to build a gadget which would mount a cartridge and sit semi-permanently outside the micro? It could then be brought in or out of action by use of a simple switch.

Also, a more complex system could be built to a accomodate more than one cartridge and allow them to be switched in or out as required. – **R.G. Bryer, Ashtead, Surrey.**

● The subject of this gadget has been looked at before and only a simple circuit is needed to allow a number of cartridges to be mounted together on one cable.

The components would make this a rather expensive device, but if enough readers write to us to prove that demand is sufficient we'll reconsider it.

More gadgets on the way

IN recent issues of Atari User *there haven't been any gadgets by your resident expert Len Golding. Has he stopped building them?* – **Dave Manning, Reddish Stockport.**

● Len has been having a rest recently, but he promises to build us some more interesting and inventive gadgets soon.

Cartridge-only cable

IS there an effective way of interfacing software like Mini Office II to a printer without an expensive interface unit?

I successfully built and installed the Epson interface from the April 1987 Gadgets series in Atari User *but the software seems to overwrite the driver routine that I install.* – **P.G. Lord, Sutton Coldfield, West Midlands.**

● Whenever your micro is switched off anything that is in ram is lost. When you load most machine code software you must initiate a boot load by switching off your micro and holding down Option when you switch on.

This means that the original driver software is lost so, as the article states, the cable will only work with commercial cartridge-based software and unfortunately not with disc-based software like Mini Office II.

Pascal alternative

I OWN an Atari 800XL and 1050 disc drive. Can you please tell me whether or not there is a software package that would enable me to use Prospero Pascal and, if so, how much it is and where I can buy it from? – **J. W. Brezezinski, Spital Tongues, Newcastle-Upon-Tyne.**

● Unfortunately, this particular program is not available for the 8 bit Atari. At one time Kyan Pascal was easily obtainable, but it is now very difficult to get hold of.

You could try getting the Action! cartridge-based language. Although it's not identical it does offer similar features to Pascal.

It is a sort of hybrid Basic/C and is available from several advertisers in *Atari User*.

Happy beginner

UNFORTUNATELY I was late in discovering Atari User, *but I now have a regular order with my newsagent so I don't miss it.*

I recently bought the back issue pack of magazines from May 1985 to November 1985 and was absolutely delighted with Mike Bibby's articles for beginners.

I'm physically disabled and so started using a computer when I could no longer work. Being a novice at computing, the series was a great help to me.

Please convey my thanks to Mike for explaining things so clearly. Also, thanks for a really terrific magazine. – **Wilma Smith, Aberdeen.**

XMM801 printer problem

I RECENTLY bought an Atari XMM801 printer and it was superb for word processing and listing Basic programs. However, a friend lent me Print Shop by Broderbund and I have found it impossible to get it to print out.

I have tried all combinations of options to no avail, so could you please tell me what the XMM801 is equivalent to? And is it possible for this program to work on my printer? – **Karen Segar, Stockport, Cheshire.**

● Unfortunately, as with all Atari printers, the XMM801 is unique. Atari has for some reason designed printers that don't work with commercial software, and Print Shop will not work with your printer no matter what preferences you choose on the set-up menu.

Italic on tap

WHILE I was working with Mini Office II on my 800XL I discovered that pressing the inverse video key causes any typing that you do after to be printed out in italic. Pressing this key again switches you back to normal print style. – **A.R. Hazzard, Swindon, Wilts.**

Dipping into the toolkit

AFTER reading the advert for the Atari User Toolkit I decided to send off for the disc version. I'm very pleased with it and I now use it every time I program or type in magazine listings.

The renumber utility is very useful and the variable name change feature is an excellent idea. I find the way that it switches itself out when you run a program is great, and it's so easy to install once it has been loaded – just press System Reset. – **Philip Marsh, Middlesbrough, Cleveland.**

The catch

I BOUGHT my children an Atari home computer for Christmas and a copy of the January 1988 issue of Atari User. *I found it an excellent publication, but I didn't understand one of the instructions on a Five Liner program – an unusual character on line 3 of Catch.*

Can you please help? – **Peter Brown, Harpenden, Hertfordshire.**

● The character you are having problems with can be obtained by pressing the inverse character key and then Control+N. A full list of these control characters was in the February issue of *Atari User.*

Long wait for a drive

WHY on earth did Atari stop producing the 1050 disc drive, especially since the new one isn't even available?

Each month I am allowed out of my straightjacket to read your masterpiece of a magazine, but with dismay I find no mention of the 1050, and no news of the release of the new drive ever graces the pages. Please could you tell me what exactly is happening? – **Martin Tiller, Oxford.**

● Atari has had some problems with the new drive, but claims it will be available soon. The classified section of *Atari User* contains many bargain offers including 1050 disc drives.

Epson drive

I OWN an 800XL and 1010 tape deck. Recently I was offered an Epson 5.25 floppy disc drive and was told that it was double-sided with a one megabyte storage capacity. Could you please tell me what interface I would need to get it working on my Atari? – **D.E. Fogerty, Salisbury, Wiltshire.**

● Unfortunately this disc drive will not work easily on your Atari and an interface to make it work would probably cost more than a new Atari drive.

How to Join: See Page 4

Time and magik

The trilogy



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Three of Level 9's most acclaimed adventures – Lords of Time, Red Moon and The Price of Magik – come together in one package. Each has been enhanced and enlarged with more text than ever before – 60,000 mind-expanding words creating magik and mystery round every corner. There's a powerful new parser, and most disc versions include stunning digitised pictures that help to dramatically heighten the atmosphere.

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RED MOON: ***Best Graphical Adventure or Best Adventure of the Year*** – *Zzap 64, Crash, Amtix, C&VG, CCI, and Amstrad Computer User.*

THE PRICE OF MAGIK: ***"Another superb adventure . . . their best yet"*** – *Commodore User. Also a Crash Smash.*







Screen shots from Atari ST version

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The Tynesoft team with head of development David Croft (bottom right)

The Winter of content . . .

NEIL FAWCETT meets the programming team behind Olympiad '88

ONE of the best known software houses producing games for the 8 bit Atari is Tynesoft. Based in Blaydon, Tyne & Wear, it is constantly bringing out quality new software to add to its already impressive range.

So it was with eager anticipation that I went to have a chat with David Croft, Tynesoft's head of software development.

The main topic of conversation was the development of its new sports simulation. Said Croft: "We were determined Winter Olympiad '88 would surpass all other sports simulations in terms of realism, playability and visual presentation". He said this was Tynesoft's most ambitious project to date, with versions being produced across as many computer formats as possible.

To make this possible all other in-house work was halted and programmers, graphic artists and freelance people alike got together to decide the game's format. The first step towards creating it was to spend lots of time watching videos of winter sports and deciding which events would appear. They eventually settled for the downhill, bob sleigh, ski jump, slalom and biathlon.

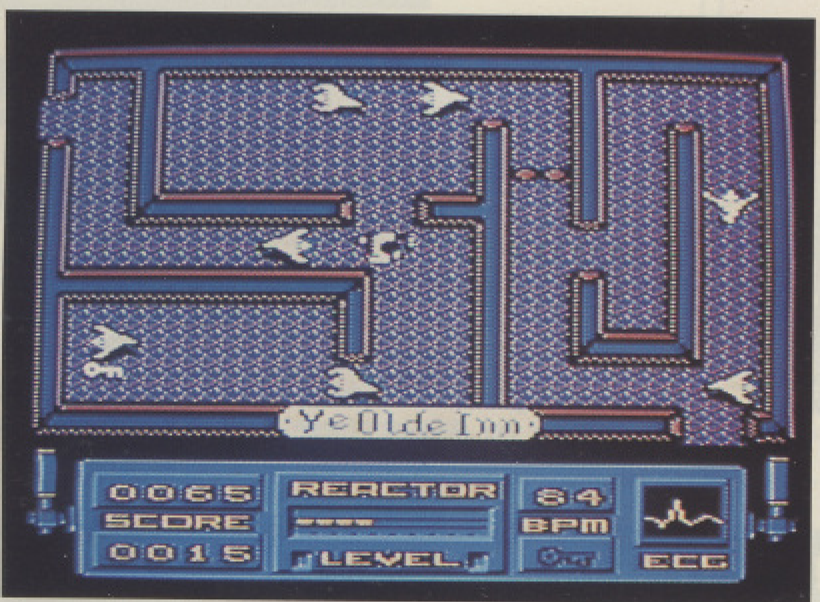
The actual programming fell on the heads of Brian Jobling (downhill), Chris Murray (bob sleigh), Mike Hedley (ski jump, slalom and biathlon) and Philip Scott was their graphics artist. It took the team three months to finish the program.

While all this was going on, managing director Colin Courtney was busy negotiating permission to use the BBC Television theme music from Ski Sunday. He also managed to get program presenter David Vine to write an introduction to the 1988 Winter Olympics to be included in the final packaging.

Tynesoft is very optimistic about the game's future. It has already sold the rights to Mindscape, an American company that will produce it under the name Winter Sports. So just how good is the game? You can find out by reading the full review by Bob Chappell on Page 26.

Now let's take a look at some of Tynesoft's more established games and their authors. Brian Jobling, who has now moved on to his own company, Zeppelin, wrote many of the company's successful games on the 8 bit Atari. His first for Tynesoft – another sports simulation – was Winter Olympics, which sold nearly 4,000 copies in its first month of sales.

Phantom was another of Tynesoft's success stories. Written originally for the BBC Micro, it was converted for the Atari by Brian with music by Ian Waugh – a widely recognised micro music expert. It's an excellent game with everything you need – good sound, stunning graphics and, above all, addictiveness.



A scene from Phantom

One of the best programs to come out of the company is Mirax Force by Chris Murray, a very talented writer with many games under his belt. He wrote this one as a freelance programmer but Tynesoft now has him under contract. Mirax Force is a wonderful sideways scrolling shoot-'em-up with digitised speech which really has you wanting just one more go.

As well as producing very good software Tynesoft wraps its products in superb packaging. This is probably because it has facilities to do its own printing and make all the cassette and disc inlays.

The future is looking very rosey for Tynesoft with the release of Winter Olympiad '88, Super Soccer – also reviewed in this issue – and the Microvalue III pack. These Geordie lads definitely seem to know what they are about.

Two discs crammed with the most popular programs from your favourite magazine!

These two exciting compilations bring together some of the very best listings from the pages of *Atari User*.

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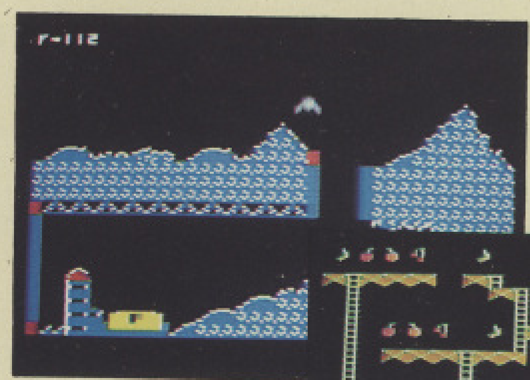
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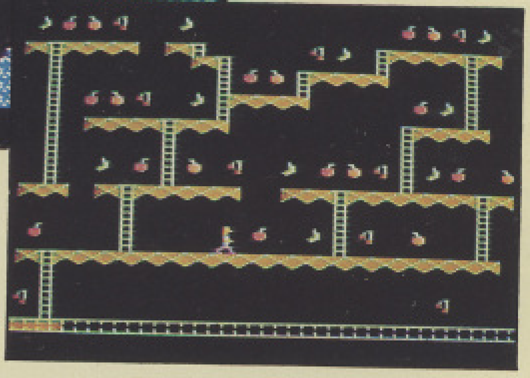
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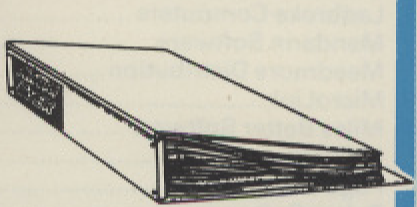


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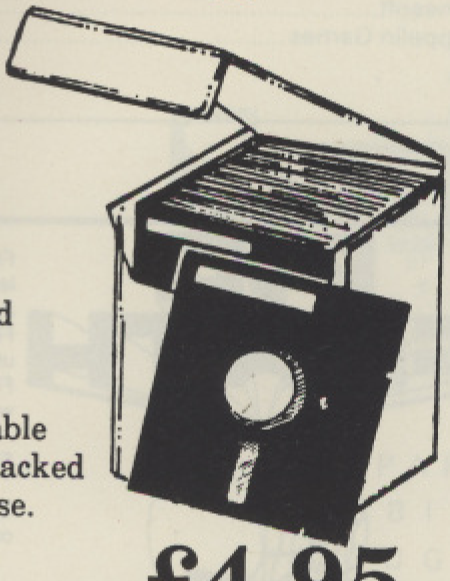
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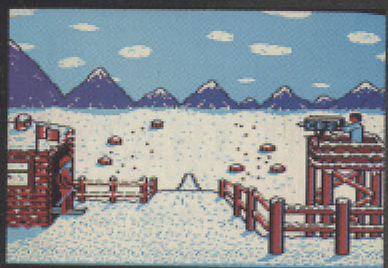
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